REVISED SUPPLEMENT

1895

RELATING TO THE

AFRICA PILOT, PART III.

~~THIRD~~ 5th EDITION,

1889.

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DVERTISEMENT TO REVISED SUPPLEMENT, 1895.

THE portion of this revised supplement relating to the Zambezi and Shiré, was published in 1890 as a pamphlet and was included in former supplements. As amended, it cancels pages 209, line 14, to 222, line 23, of the Africa Pilot, Part III.

That relating to Pemba island, and the Mainland from Tanga bay northward to Malindi and Lamu, is from the surveys and remarks of the late Commander T. F. Pullen, Lieutenant A. Balfour, and Lieutenant M. Smyth, H.M. Ship *Stork*, 1889-92, and information received from H.M. ships up to date, and cancels pages 388 to 398, to Mainland, and pages 404 to 418 line 6 from bottom.

All Notices to Mariners relating to Africa Pilot, Part III., Third Edition, including No. 136 of 1895 and the revised supplement 1892, are hereby cancelled.

W. J. L. W.

Hydrographic Office, Admiralty, London.
April 1895.

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For information respecting the lights which are described in the Africa Pilot, Part III., seamen should consult the Admiralty List of Lights, South Africa, East Indies, &c. This Light List is published early in the current year, corrected to the preceding 31st December. The changes in the Africa Pilot, in lights and fog signals, to the date of this Supplement will be found at the end.

1892.

The existence of this revised Supplement is to be entered on the opening page of the Africa Pilot, Part III., Third Edition, 1889. *The information contained in it is to be carefully considered.*

REVISED SUPPLEMENT

1895

RELATING TO THE

AFRICA PILOT, PART III.

THIRD EDITION,

1889.

The following information is derived chiefly from the surveys and reports of H.M. Ships.—*See* advertisement.

The paragraphs are arranged in the order of the paging of the work ; the pages referred to will be found herein in the margin.

All bearings are Magnetic.

CHAPTER I.

Protectorates.—The parallel of lat. 10° 40′ S. (about cape Delgado) forms the frontier from the coast till it stripes the Rovuma river, between German and Portuguese territory. Thence northward to the mouth of the Umba river in about lat. 4° 41′ S., including Mafia island, is German territory. From the Umba river to the Juba river, including the adjacent islands, also the islands of Zanzibar and Pemba, belonging to His Highness the Sultan of Zanzibar, is British territory. Zanzibar is a free port. pp. 6, 7, 361.

See chart, No. 597.

pp. 6, 7, 361. The Juba is the boundary between the British and Italian spheres of influence. The Sultan of Oppias' territory on the coast, lies between 2° 30′ N. and Ras Awath, in about lat. 5° 52′ N. Amend pages 6, 7 and 361 from this information.

p. 8. **Mail Communication.***—There is fortnightly communication between England, Cape Town, Port Elizabeth, East London, Natal, and Delagoa bay, both by the Castle Mail Packets and by the Union Steamship Company. Each Company have also an intermediate ocean service between England and those places, Delagoa bay excepted. Branch steamers are also despatched fortnightly from Cape town to Mossel bay, Knysna, Port Elizabeth, East London, Port Natal, and Delagoa bay.

Each alternate steamer of the Union Line proceeds (monthly) to Innambán, Beira, Chinde, Kilimán, Mozambique, and Zanzibar. At Zanzibar they connect with the British India Steamship Company, and the French Messageries Maritime, which vessels proceed direct to Europe *viâ* Suez Canal. The British India Company have discontinued their service southward of Zanzibar.

The Castle Line call at Beira fortnightly; this line also has monthly communication with Tamatave and Mauritius, *viâ* Natal. The German East Africa Line from Hamburg, *viâ* Suez canal, call at Tanga, Zanzibar, Dar-es-Salaam, Lindi, and Natal (monthly), returning the same way.

This Line has also a subsidiary service from Lamu to Innambán, calling at all the ports on the intermediate coast.

p. 17. **WINDS northward of Zanzibar.—South-west monsoon.**—Line 21. *Add:* The winds from 20 to 40 miles from the coast of Africa have been observed for a period extending over many passages of the B. I. S. N. Co.'s vessels, as follows :—

Zanzibar to 4° N.

May—Strong S.E.—S.—S.S.W., rain.
June do. do. do.
July do. do.
August—Light to moderate.
September—Light S.S.E.—South.
October—Light, southerly.

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* Cancels Mails on page 8 of the Pilot. Amend also in the Pilot the places affected.

See chart, No. 597.

From 4° N. to Ras Hafún. p. 17.

May—Light, variable, squalls, and rain.
June—Strong wind, increasing, S.S.W.
July—Moderate gale, S.S.W.
August do. S.S.W.
September—Strong wind, S.S.W.
October—Light winds, calm, N.E. to East, rain.

Ras Hafún to Ras Asir.

May—Light variable winds.
June—Strong gale, S.S.W.
July do. do.
August do. do.
September—Strong wind, S.S.W.
October—Light from East to N.E.

Line 22. Insert a semicolon after the word *increased.* p. 25.

Line 22. Insert as a footnote.—During the month of February 1891, the southerly set of the current along the coast was experienced by several vessels, considerably southward of Lamu. The north-east monsoon was unusually strong. p. 26.

Line 15. For 7° E. *read* 70° E.; line 20, for Chagos *read* Maldives. p. 34.

CHAPTER II.

TABLE BAY.—Breakwater and docks.—An iron jetty, named the Loch jetty, 600 feet in length, and 70 feet in breadth, has been erected seaward of and parallel with the coaling jetty, having a depth of 30 feet alongside. Many buoys have been placed for the convenience of warping. p. 43 & footnote.

The patent slip is 360 feet in length by 63 feet in breadth, with a depth of 22 feet at its lower end at high water ordinary spring tides. p. 44.

See plan, No. 123.

p. 45. **Time Signals.**—The ball is dropped, and the gun fired, at 1h. 30m., Cape Colony, mean time, corresponding to Greenwich mean noon.

p. 46. Amend lines 11 and 12. The sheers within the coaling jetty are capable of lifting a weight of 50 tons. There are two hand cranes in the dock, but none at the slip, or elsewhere.

p. 62. Line 1. For 2500 *read* 220 yards.

Lines 22 and 23. The disc falls at 1h. 30m., Cape Colony mean time, corresponding to Greenwich mean noon.

p. 64. Line 19. For 22·95 *read* 29·95.

p. 69. **Danger point, light,** *see* p. 150.

pp. 71, 77. **CAPE AGULHAS—Reported dangers near.**—A report has been recently received that the steam-vessel *Mexican* struck, on the 2nd December 1894, some obstruction off cape Agulhas, with the lighthouse bearing N.E. $\frac{3}{4}$ E. (N. 53° E.), distant about $1\frac{1}{4}$ miles.

A former Notice to Mariners, No. 208 of 1892, stated that the steam-vessel *Alcestis* had then struck an obstruction off this cape, but that the particulars given were not sufficient to enable the position to be ascertained with any degree of exactness; it was however assumed to lie about $2\frac{3}{4}$ miles W. $\frac{1}{2}$ N. (N. 84° W.) from cape Agulhas.

Mariners should remember that not only off cape Agulhas, but off all other parts of the south coast of Africa, and especially off salient points, sunken wrecks or uncharted dangers may exist close to the coast; and that it is not advisable to approach this surf-beaten shore, even in full-powered steam-vessels, within at least 2 or 3 miles. When a strong adverse current prevails the temptation is great, but west of Algoa bay there is nothing to be gained by so doing, while a risk is run (in case of a breakdown in the machinery or any temporary error in the course) of total wreck before any efforts can be made to avoid such a catastrophe. Sailing vessels should keep 7 or 8 miles off shore as recommended in Africa Pilot, part III., page 77.

On this coast the water breaks in heavy swells in 10 fathoms. If therefore a rock, with its top near enough the surface to bring up a

See chart, No. 2,572, &c.

ship, existed in this position in about that depth, it would, unless a most unusual pinnacle, undoubtedly break long before the whole area is a mass of breakers, which occurs in bad weather. The light-house keepers at Agulhas report no such occurrence, and it appears more probable that the obstruction is a wreck. pp. 71, 77.

On the Admiralty Charts however "rock hereabouts" has been written at the spot where *Mexican* reports touching.

Mossel bay.—Lights.—Both the *red* and *green* lights are now exhibited from the end of the pier. The green light is not visible from seaward until bearing S.W. ¾ S., or southward of that bearing. *See also* p. 150. p. 84.

Signal station.—Vessels can communicate with the shore by the International Code ; the flagstaff is situated near the port office.

Line 3. Windmill does not exist. p. 85.

Lines 7 to 9. Omit the words—and the only house near the cape —*also*—and a line drawn from the windmill through—. The bearings of the remaining objects are sufficient for the anchorage.

CHAPTER III.

Knysna river.—Pilots.—A pilot house, painted white, has been erected on the summit of Outer Obelisk point, and the signal staff hitherto on Inner Obelisk point, removed to the pilot house, forming the signal station for Knysna harbour. The house is visible from a considerable distance seaward, and is a good landmark. p. 92.

Glassen and Chelsea points.—Foul ground.—From the report of a Court of Inquiry, held at port Elizabeth in 1890, into the loss of the S.S. *Strathblane*, by striking on a rock near the shore westward of cape Recife, it appears that foul ground may exist about one mile from the shore westward of Chelsea point for a distance of about 5 miles. Further, it is not improbable that the unsounded area fronting the coast between Chelsea point and Glassen point may contain many hidden, and as yet unknown, dangers.* pp. 105 106.

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* *See* Admiralty charts :—Cape St. Francis to Waterloo bay, No. 2,085 ; and Algoa bay, No. 642.

CHAPTER IV.

p. 109. **Cape Recife Light.**—*See* p. 150.

p. 110. **Port Elizabeth** —Line 1, for *white* read *red.*

p. 111. **Jetties.**—The north jetty has been extended, and is now 384 yards in length by 28 yards in breadth, with a depth of about 24 feet at its extreme at low water springs.

Vessels of not more than 20 feet draught are allowed alongside on due notice being given to the Harbour Master. Hydraulic capstans and screw moorings are provided, and arrangements have been made for watering and ballasting from alongside.

Both jetties are equipped with hydraulic cranes ; one of these, on the south jetty, is capable of lifting weights up to 20 tons.

p. 112. Line 4, omit price, and *read*, at a fixed charge.

Time signal.—The ball is dropped at 1h. 30m. Cape Colony mean time, corresponding to Greenwich mean noon.

p. 115. Par. 5. *Substitute* : To prevent injury to the jetties by vessels drifting upon them in south-east gales, no sailing vessel is permitted to lie to the southward of a line from the Hill lighthouse through the north Malay mosque, and should any vessel anchor southward of this line, she must shift her berth to the northward as soon as circumstances will permit. Steam vessels are to anchor southward of a line from the Hill lighthouse through the south Malay mosque. The light on the north jetty, showing *green*, leads clear of all danger for boats landing. It shows *white* inshore. On the south jetty is a *red* light.

p. 116. Lines 1 to 5, par. 10. *Substitute* : On all occasions when it is considered unsafe to work cargo, a blue light will be hoisted on the flagstaff on the north jetty, and when it is unsafe to land, a red ball will be hoisted. At these times ships' boats should never attempt to land.

p. 117. Signal No. 11, for No. 1 Marryatt *read* S, commercial code.

Signal No. 12, for No. 2 *read* J.

No. 13, *read* union jack over black ball with J below.

No. 14, for No. 3 *read* H.

See plan, No. 641.

No. 15, for No. 4 *read* M (blue with white cross). p. 117.

No. 16, for No. 5 *read* B.

No. 17, for No. 6, &c., *read* R (red with yellow cross).

Bird island light. *See* p. 150. p. 119.

PORT ALFRED. Lines 10 to 13. Omit after the word *embankments* and insert—terminating in piers constructed with concrete blocks, of an average breadth of 70 yards. Vessels of 10 to 11 feet draught can enter the river at high water. p. 127.

Lines 19, 20, omit remainder of sentence after the word, *quays.*

Omit sentence on 9 and 10, and insert.—In fine weather, vessels of 10 to 11 feet draught, with the assistance of a pilot, may cross the bar, but at present no tug is available, and only small coasting craft within the draught mentioned, use the port. p. 128.

Omit bottom line except last letter (A.) p. 129.

Lines 1 to 3; omit the remainder of sentence, from the word, *purposes.* p. 130.

Lines 4 and 5; omit the remainder of sentence, from the word, *draught.*

Lines 11 and 12. There is no tug at present.

Time signal.—The ball is dropped at 1h. 30m. Cape Colony mean time, corresponding to Greenwich mean noon.

Riet (Reid point) reef.—As rocks have been more than once vaguely reported to exist some distance beyond Riet point reef as charted, mariners should give the point a berth of at least 3 miles. p. 131.

Hood point.—Intended light, about May 1895.—*See* p. 150. p. 140.

Line 5. Omit the word *apparently.* p. 141.

BUFFALO RIVER.—Bar.*—Vessels of 14 feet draught can cross the bar at high water springs in moderate weather, and of 12 feet draught at high water neaps. p. 142.

The entrance between the breakwater and the north training wall is about 250 feet wide.

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* *See* plan of Buffalo river, No. 1,843.

p. 142. **Pilot.—Directions.**—There is a Government pilot for the bar, and no vessel should attempt to cross it without local knowledge. In case of emergency, it might be mentioned, that the wind gauge at the harbour works kept in line with the lighthouse, leads over the bar in the best water, but it is subject to change. The dredgers are constantly at work.

General Port Office Signals.

Union Jack over S (white pierced blue)	Prepare for bad weather.
Union Jack over J (blue, white, blue horizontal)	Veer cable and put spring on.
Union Jack over black ball, J underneath	Veer to whole cable and put spring on.
Union Jack over H (white and red vertically)	Heave in cable to same scope as when first anchored.
Ensign over black ball	Slip and put to sea, lee vessels first, to avoid collision, but those that can get away clear, do so at once.

Black ball at mast head : impossible to cross the bar. (*No boat should attempt to cross the bar while this signal is up.*)

Black ball three parts of the way up : Bar dangerous. (*Caution to boats working.*)

However smooth it may be ships' boats should never attempt to cross the bar. When lighters are working, a red flag with a white centre is hoisted at the port office flagstaff, but hauled down altogether when the bar is impassable.

All signals made from the port office must be answered from the shipping and strictly obeyed ; and any vessel disregarding them will be reported to Lloyds', and also to their owners.

Landing.—Omit lines 5 to 11 from bottom, as the surf-boats are discontinued, in consequence of the bar allowing vessels of 15½ feet draught to enter the river under favourable circumstances.

See plan, No. 1,843.

Lines 1 to 4 from bottom probably still apply to the bar ; but the words *signals for the surf-boats* should be omitted. p. 142.

Beacons.—To distinguish the coast in the neighbourhood of Buffalo river, the two undermentioned beacons have been erected:—

A wooden pyramidal beacon, its top 381 feet above the sea, is situated on a hill about 14½ miles westward of East London. The beacon, 51 feet high, and coloured black, stands on an equilateral triangular base (each side of the base 27 feet), and terminates in a sharp point. It should be seen in clear weather from a distance of 23 miles. The hill, green, flat topped and smooth, is 330 feet above the sea, and about 1¼ miles from the shore. Approximate position, lat. 33° 9′ S., long. 27° 40′ E.

A wooden pyramidal beacon, surmounted by a ball, 368 feet above the sea, is situated on a hill about 15 miles eastward of East London. The beacon, 52 feet high, and coloured black, stands on an equilateral triangular base (each side of the base 29 feet, each side of the top 1¼ feet, and the ball 10 feet in diameter). It should be seen in clear weather from a distance of 21 miles. The hill, green, flat topped and smooth, is 316 feet above the sea, and about one mile from the shore. Approximate position, lat. 32° 50½′ S., long. 28° 6½′ E.

Supplies.—Water is supplied by the Castle Mail Co. at 10 shillings per ton to vessels in the river, and 20 shillings per ton to those in the road, brought alongside by the Company's tugs. Provisions are good and plentiful. Steam launches are available for landing and embarking passengers. p. 143.

Time signal.—The ball, shown from an iron frame on Signal hill, is dropped at 1h. 30m. Cape Colony mean time, corresponding to Greenwich mean noon. Should the signal fail in accuracy, a yellow flag is hoisted about 5 minutes after the ball is dropped. It cannot be seen from vessels lying alongside the wharves.

Tides.—Line 26, *add*—The flood stream sets into the river across the bar at the rate of three-quarters of a knot, the ebb sets out at about 1¼ knots. There is said to be less water on the bar during S.E. winds than with N.W. winds.

See chart, No. 2,086.

CHAPTER V.

p. 155. **Mazeppa bay.*—Signal station.**—The United Boating Co. of East London have erected a private signal station and flagstaff on the high ground above Mazeppa bay, in lat. 32° 28′ S., long. 28° 39¼′ E. The station is intended to enable vessels in distress to signal for assistance, which will be sent from East London, a scheme of telegraphic communication having been arranged with that port through the town of Butterworth.

p. 158. **Bashee river.—Beacon.**—In order to distinguish this part of the coast, a beacon 50 feet in height, painted black, and presenting the shape of a diamond, has been erected on a round-topped, grassy hill, about 150 feet above the sea, at about half a mile north-east of Bashee river entrance. The beacon is in lat. 32° 14¼′ S., long. 28° 54½′ E., and should be seen from a distance of 16 miles in clear weather.

p. 164. Line 11 from bottom. *Add*—On the south side of the Untamvuna river there is a strip of sand up the side of a wooded hill, which shows like a road; coming from the northward it opens out on a W. by N. bearing. The south point of the Umtentu river is marked by a quoin-shaped hill. There is a large house on the south bank of the Izotsha river, 2 miles southward of port Shepstone.

Umtitchwana or Umzinto bay, about one mile northward of the Umzinto river, and 2 cables southward of Umzimayo river, is now used for landing purposes.

p. 165. **LIGHTS marking Aliwal shoal.†**—*See* p. 150. Line 6 from bottom, *add*—From a perusal of the lights, it will be seen, that vessels passing seaward of Aliwal shoal with one red light in sight will be about 6 miles from the shoal, and both red lights can only be seen at once when within that distance; vessels proceeding inside the shoal will pass in nearly mid-channel with one red light only in sight.

p. 166. **The Scottsburg landing,** now disused, is situated just southward of the mouth of the Umpambinyoni river, on which is the township of Scottsburg.

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* *See* charts, Nos. 2,086, 2,087.

† *See* chart, No. 2,088.

NATAL.*—**Bar.**—The Innes or south breakwater is completed; its outer end is nearly half a mile from the Bluff lighthouse. The north pier end is about 250 yards within the end of the breakwater. Training walls are still in progress. pp. 169, 170.

The mean depth on the bar in 1893 was 13 feet 4 inches; maximum 15 feet 2 inches; minimum 11 feet 9 inches. (In April 1894, owing to heavy weather, the depth was only 10 feet.) The S.S. *Gaul*, 400 feet in length and 4,745 tons (draught not stated), entered in October 1893.

The bar in 1893 was impassable for four days, and dangerous for 14 days, as against 15 and 35 days respectively in 1890. p. 172.

Boundary.—After line 13.—About midway between Sordwana bay and point, or lat. 27° 19′ S., is the boundary on the coast between Zululand and Tongaland. p. 181.

DELAGOA BAY.†—Inyack island.—The white barrack is partially hidden by small trees, but its red roof is distinguishable. Page 182, line 12, and page 194, line 16. pp. 182, 194.

Cape Inyack.—Light.—On the sand hill near its extreme is a lighthouse. *See* Light, p. 150.

Cockburn and Hope shoals.—Buoyage.—A black conical buoy with staff and triangle marks the north extreme of Cockburn shoal, south side of Cockburn channel, with cape Inyack bearing S.S.E. $6\frac{9}{10}$ miles, and Gibbon point beacon S.S.W. $\frac{1}{4}$ W. A red spherical buoy is placed near the $3\frac{3}{4}$ fathoms patch of Hope shoals, in $5\frac{1}{2}$ fathoms, with Inyack hill bearing S. $\frac{1}{2}$ W. distant 9 miles. p. 183.

Depths of $4\frac{3}{4}$ to 5 fathoms have been obtained at $3\frac{1}{4}$ miles W. $\frac{1}{2}$ N. from the west patch of Domett shoals, over a space about half a mile in extent in a north and south direction; the depths beyond it are also less than are shewn on the chart, on which too much dependence must not be placed. p. 184.

Lech reef.—Buoy referred to in former supplement is discontinued.

Line 31. For red streak 177 ft. *read* white house (barrack).

Light.—Reuben point, *see* p. 150.

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* *See* plan of port Natal, No. 643.

† *See* Admiralty charts, Delagoa bay, No. 644; also Nos. 646, 648 and 2,089.

p. 185. **Beacons.**—Lines 17 to 19.—Shefina beacon has been removed. A house with a galvanized roof is situated half a cable westward of the site of the beacon, and is said to be visible from a distance of 10 miles.

Lines 34 and 35. Omit remainder of sentence after the word *top.*

pp. 185–188. **Caution.**—The buoys and beacons in Delagoa bay are not to be depended on.

p. 187. Line 1. For cape Inyack *read* which Cape Inyack lighthouse stands.

Line 3. Omit the words *for a distance of 5 miles.*

Line 5. For should bear *read* bears. (Shefina and some other points are said to be incorrectly charted ; as soon as Reuben point lighthouse is made out, it seems advisable to bring it between the bearings of N. 73° W. and N. 79° W., as at night.)

Line 7 from bottom, after the word *tide.* Insert—and northward of the red buoy, if in position, but it must not be depended on.

Line 10 from bottom for S.E. *read* S.W.

p. 188. **English river.—Beacons.—Light.**—Omit lines 18 to 22 and insert :—Two beacons erected on the Catembe shore, the south side of entrance to English river, within Mawhone point, when in line bearing S. 65° W. (true), West (mag.), mark the fairway over the bar, in 12 feet at low water springs and 24 feet at high water springs. The front beacon is an iron pyramidal structure 36 feet in height, painted white and standing on a square white base. The back beacon is cylindrical, painted black, and also standing on a square white base. It stands on higher ground than the front beacon, and just behind it is a house of a dullish red colour.

A *white* light is exhibited from the back beacon, visible on the bar over an arc of 12°. *See* p. 150.

Bar.—Directions.—Amend depths in lines 27, 28 from the above.

Omit lines 34 to the bottom and three lines on p. 189, and insert :—

The beacons in line, bearing West, lead over the bar in 12 feet a low water springs (about 2 feet less than is shown on the plan) ; thence southward of Reuben point buoy and to the anchorage off the town, avoiding the shore bank between Reuben point light and the town.

See plan, No. 646.

At night, by keeping in the *red* sector of Reuben point light will lead to the bar; when Mawhone beacon light (*white*) is in sight bearing about West, steer for it, until the lights of the town are well open southward of Reuben point light, when haul up for the anchorage. These directions should be used with considerable caution. p. 188.

Lines 23 and 24. Re-instate red buoy, and for 19 ft. *read* about 15 ft.

Line 9. This mud flat is reported to have extended; it is to be buoyed. p. 189

Town.—The town of Lorenzo Marques is being gradually improved. Many new houses and stores have been built and some progress has been made in making and paving the streets, and in filling up the swamps surrounding the town. It is proposed to supply the town with water from Komati river. pp. 189, 190.

It is contemplated making Lorenzo Marques the capital of Portuguese East Africa in place of Mozambique.

Pier.—An iron pile pier, 297 feet in length, has been constructed abreast the Custom house, with a depth of 12 feet at its extreme at low water springs.

There is a hospital containing 128 beds and also several fair hotels with moderate charges, about 12*s.* 6*d.* per day.

Population 3,500, of which 2,200 are natives.

Coal.—The best Welsh coal is obtainable in any quantity at about £4 per ton (H.M.S. *Blanche*, 1893). There is said to be large beds of excellent coal near Middleburg, about 150 miles inland, and through which the railway passes.

Railway.—The Portuguese railway to the frontier and its continuation by the Netherlands Company, is now open to Pretoria, a distance of 346 miles. Nelspruit, 129 miles from the port, is 2,416 feet above the sea; and the summit of the whole line, at Bergedaal, 214 miles from the port, is 6,437 feet above the sea. The width of the line is 3 feet 6 inches.

Mails.—The Union and Castle lines of steamers call here fortnightly; four other lines call here. There are five mails per month.

Climate.—In May and June 1891, H.M.S. *Mohawk* met with exceedingly fine weather, on two days only did any rain fall, that p. 191.

See plan, No. 646.

p. 191. being with an E.S.E. wind, shifting to S.W., the remainder being bright and clear. The temperature ranged from 82° in the daytime to 58° at night, the difference between the wet and dry bulbs being about 8°, but on several days it was as much as 14°.

p. 195. **Limpopo river.**—A depth of 21 feet at high water was found on the bar in 1890. A depth of 11 feet only was found in June 1893; and at half a cable on either side of the line of beacons for the bar the depth was but 9 feet. It is subject to change.*

p. 196. **Zavora river.—Shoals.**—A shoal of $2\frac{1}{4}$ fathoms, on which the S.S. *Courland* was said to have struck, is charted 6 miles southward of Zavora river, in lat. 24° 58′ S., long. 34° $22\frac{1}{2}$′ E.; the position, amended is lat. 24° 57′ S., long. 34° 25′ E., but both positions are placed on the charts.

The *Countess of Carnarvon* reports a shoal of $2\frac{1}{4}$ fathoms, on which the sea occasionally breaks, in lat. 24° 57′ S., long. 34° 22′ E. They are possibly identical. The coast between Zavora point and to the westward of the Limpopo river is entirely unsurveyed, and should be given a wide berth.†

CHAPTER VI.

pp. 199, 200. **INNAMBÁN RIVER.—Buoyage and Beacons.**‡—The buoyage of Innambán river was re-arranged about June 1894 as follows:—

A buoy, painted red, is moored seaward of Innambán river on the leading line for crossing the bar, in a position with Kosh △ bearing W. by N. $\frac{7}{8}$ N. (N. 69° W.), distant $6\frac{1}{10}$ miles; and Barrow hill S. by W. (S. 11° W.).

A buoy, painted black, is moored on the western side of the channel, in a position with Pedestal bearing S.W. by W. $\frac{7}{8}$ W. (S. 66° W.), distant $8\frac{1}{2}$ cables; and Kosh △ N. by W. $\frac{5}{8}$ W. (N. 18° W.).

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* A plan of the entrance, surveyed in 1893, is being engraved on chart, No. ~~648~~.

† *See* Admiralty charts, Nos. 648 and 597.

‡ *See* Admiralty plan of Innambán river, on No. 650.

** See plan of Limpopo river on BA. No. 685

The red buoy opposite the last (3) has been moved to the north-eastward and is now moored with Pedestal bearing W. ½ S. (S. 84° W.), distant nearly $1\frac{6}{10}$ miles; and Algoa point clump N. ¼ W. (N. 3° W.). pp. 199, 200.

The buoy, moored E. ⅝ N. (N. 83° E.), distant $1\frac{2}{10}$ miles from Linga Linga point △, has been altered in colour from red to black.

The red buoy, southward of Linga Linga point, has been moved to the south-west, and is now moored with Linga Linga point △ bearing N. ¼ E. (N. 3° E.), distant 1⅓ miles; and Mafarun island S.E. by E. ⅞ E. (S. 66° E.).

A black buoy marks the opposite side of the channel, and lies N.W. by W. ½ W. nearly 3 cables from the red buoy.

A buoy, painted black, is moored on the western side of the channel, in a position with Obra (55) bearing N.W. ⅛ N. (N. 35° W.), distant 10½ cables; and White house S.W. ½ W. (S. 50° W.). The bank near the red buoy on the opposite side of the channel to this buoy is reported to be shifting.

Two buoys, 1⅓ cables apart, mark the sides of the channel abreast Belan point, in same position as previously charted.

Beacons.—A beacon, named the Pedestal, constructed of masonry, is situated on the coast of Lingalinga peninsula, with Algoa point clump bearing N.E. by N., distant $2\frac{6}{10}$ miles nearly. A beacon, constructed of wood, four sided, and surmounted by a disc, painted white, is situated about 300 yards S. 14° W. from Double Bush (Three trees) hill.

Directions.*—The leading mark to the Bar buoy and over Innambán river bar, is the Pedestal in line with Double Bush beacon bearing W. by S. ½ S., which mark leads in nearly to the first pair of buoys. Thence keep the black buoys on the starboard hand and red buoys on the port hand, until southward of the buoys abreast Obra; thence with the left tangent of Shikaki cliff in line with Summit, bearing N. ¾ E. astern, until near Belan point, when edge a little to the eastward and pass between the two buoys off that point to the anchorage off Innambán.

Depths of 17 feet have been obtained at high water neap tides on the bar, but there is almost always a heavy swell, and vessels drawing more than 14 feet should not enter the river without a pilot.

* *See* plan, No. 650. A steam-vessel with a draught of 16 feet crossed the bar at the end of 1894.

pp. 199, 200. At times the sea breaks right across the river entrance; when such is the case, only steam vessels of good power and light draught should attempt to cross the bar.

Caution.—The bar is subject to change and the buoys are not to be depended upon.

p. 201. **Trade.**—The value of the exports in 1893 was £28,860 and the imports £38,628.

p. 203. **Bazaruto and Marsha islands.—Lights.**—*See* p. 152.

A plan is being prepared of the Bazaruto islands on chart No. ~~648~~ 685.

Pilot.—A pilot is obtainable to take a vessel to the anchorage.

p. 204. **Sabi river.**—Mr. A. V. Williams writing from Chiluán, October 1892, states that he ascended the Sabi river to the farthest point where the tide was felt, or about 30 miles from its mouth. He entered by the northern or Makau branch of the Sabi, which has a bar with 5 feet at low water and is about half a mile wide. He returned to Chiluán by a small creek which branches off the Makau, navigable by boats.*

p. 208. **PUNGUE RIVER.†—General Remarks.—Aspect.**—The land about the mouth of the river is very low, and if coming from the southward cannot be seen until close to the outer buoy. To the northward of the river a series of low sand hills covered with scrub extend along the shore, off which the water appear to be very shoal, 6 and 7 fathoms having been obtained at about a distance of 6 miles. On nearing the outer buoy, Massique point shows up well, making as a dark bluff point, caused by the tall straight trees which grow down to the water's edge. The Chirora group of palms to the southward will also be easily recognised for they are the only palms growing in the vicinity; also the signal and light tower erected near Jea point, southward of the settlement.

After passing the outer buoy, the masts of the shipping will be visible over Beira, and about 3 miles farther in, the tower on Chiveve point and the iron buildings, forming the settlement will be visible.

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* Proceedings Royal Geographical Society, March 1893.

† *See* Admiralty plan of river Pungue, No. 1,003; scale, *m* = one inch; also coast sheet, Delagoa bay to river Zambesi, No. 648.

Shoal in the approach.—H.M.S. *Mohawk* in 1893, passed over p. 208.
a shoal with 4 fathoms water when in approximately lat. 19° 50½′ S., long. 35° 4½′ E. On nearing the shoal, which is apparently of small extent, the soundings gradually decreased from 7 to 4 fathoms and then deepened to 6½ fathoms. (*See* Chart, No. 648).

Bar.—The entrance of the river is obstructed by numerous banks which extend some distance off the land, and partially dry at low water springs. A fairly wide navigable channel (marked by buoys) exists, which has from 3 to 4 fathoms at low water up to No. 5 buoy, south-eastward of Massique point. Abreast Massique point a flat with about 14 feet* least water extends nearly across the channel from the banks on the eastern side, between which and Massique spit there is apparently a channel with about 20 feet least water, but this depth is not to be depended on as the channel is subject to considerable change.

Buoys and Beacons.—From the latest information, 1894, the positions of the buoys were as follows, but they are not to be depended on :—Black buoys mark the starboard hand of the channel when entering and red buoys the port hand.

No. 1 buoy, red, conical, with staff and cross, is a fairway buoy in about 5¼ fathoms, with the light tower bearing N.W. ⅔ N. distant nearly 8 miles. Nos. 2, 3 and 4 are red buoys nearly in line, and marking south side of channel. No. 2 buoy lies in 4 fathoms, W. ⅓ S., distant 3½ miles from No. 1 ; No. 3 lies W. by N. ¾ N., $1\frac{8}{10}$ miles from No. 2, and No. 4 on the same bearing, $4\frac{1}{10}$ miles from No. 2, both in about 4 fathoms. No. 5 is also red, and lies with Massique point N. by W. ¾ W. distant $3\frac{2}{10}$ miles, in about 5 fathoms. No. 6, black, lies between Nos. 4 and 5, and is placed just southward of a 7 feet patch on the north-east side of the fairway. No. 7, also black, is placed on the west edge of the flat forming the east side of the channel, with Massique point W. by N. ½ N., distant $1\frac{8}{10}$ miles.

Signal tower.—Lights.—A tower, constructed of wood and iron and painted in red and white horizontal bands, stands on point Jea, and is visible some distance beyond the outer buoy under favourable circumstances. A *white fixed*, p. 152, light is exhibited from this structure. It is also a signal station.

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* *See* plan, No. 1,003. There was said to be as little as 11 feet at one period in 1894.

p. 208. Also at 1½ cables S.S.W. of Chiveve point stands a corrugated tower, of iron, 60 feet in height, similarly painted. The Portuguese flag is hoisted on the flagstaff on its summit (*see* sketches of towers on plan). A small *red* light is shown from it towards the anchorage, to assist boats coming in at night.

Directions.—If certain of the vessel's position a course may be shaped for the outer buoy; otherwise it is advisable to make the sand hills to the northward of the entrance and then steer to the southward a distance of 5 to 6 miles from the shore, and keep in not less than 7 fathoms. When the sand hills cease, a good look out should be kept for the outer buoy.

The outer buoy, a large conical black buoy with staff and cross, visible about 5 miles, should be approached between the bearings of N.W. and W.S.W., this will keep a vessel clear of the banks which extend for a long distance on either side off the shore.

On nearing the outer buoy, the land will gradually become visible, as before stated, also the tower on point Jea.

Pass the outer buoy close-to, and steer about West to pass northward of No. 2 buoy. From abreast No. 2 buoy steer W. by N. ¾ N. northward of Nos. 3 and 4 buoys and southward of No. 6 black buoy. When well past No. 4, haul up for Massique point, allowing for tide, passing westward of No. 6, and between Nos. 5 and 7 buoys, observing that the deeper water is near No. 5, and along the edge of Massique spit, which, however, should be passed at a prudent distance, there being nothing to guard it. From abreast No. 7 buoy, course may be steered for the anchorage off the town. The stream sets obliquely across the course from about abreast and within No. 6 buoy. Springs run at the rate of 4 to 5 knots and neaps from 2 to 3 knots.

It is necessary to guard against being swept on to Massique bank on the flood. The bottom is, however, soft, and will probably do no damage.

Above Beira the river is intricate; the navigable channel is winding, and the banks and crossings are continually changing, thus rendering it inadvisable to attempt ascending without local knowledge. *See* river steamers, p. 24.

BEIRA.—Beira is a Portuguese military station, and is situated on Chiveve spit, a low sandy point forming the east side of the

See plan, No. 1,003.

entrance to the Pungue river. In 1891, it consisted of a couple of huts and a small stockaded fort, whose name was unknown to the world. It has now become a port of considerable importance as the gateway to the rapidly developing territories administered by the Mozambique and British South African Companies. *See* railway, &c., p. 25. p. 208.

The town is nearly an island at high water, and during springs and freshets is sometimes inundated, and was in danger of being washed away; but the construction of a breakwater on piles has served not only to prevent further encroachments of the river, but also to restore some of the lost ground. A bridge over Chiveve creek connects Beira with the mainland. At low water it is surrounded by swamps of black mud. The land about the settlement of Bangue, north-eastward of it, is under water during high river at spring tides.

Landing stage.—There is a substantial wooden landing stage, 293 feet in length by 82 feet in breadth, connected with the Custom house. It has one crane capable of lifting 30 cwt.; two larger ones are shortly to be added. Rails from the crane run to the Custom house stores. The water alongside is only deep enough for lighters.

Anchorages.—The anchorage for men-of-war is just off the fort, in from 4 to 5 fathoms; and for merchant vessels, just off the entrance of the creek, above the men-of-war anchorage, in about 6 fathoms.

Supplies.—Fresh provisions are procurable in limited quantities; some vegetables and fruit are brought from the Buzio river, where some Portuguese colonists have settled and are apparently thriving. *See* p. 26. Canned provisions of all descriptions can be procured, but prices are high. Beira has three hotels, and Fontesville two. There is also a hospital at Beira.

Game of all sorts abound on the banks of the river; buffalo, quagga, wild pig, all kinds of buck, geese, ducks, quail and the koran or lesser bustard. Lions and wolves also are found up country. Alligators swarm, and hippopotami are numerous in the river.

Water.—The want of good drinking water, which was severely felt in 1892, has been provided for by the use of a number of large

See plan, No. 1,003.

p. 208. galvanized iron tanks, in which the water is stored during the rains.

Currency.—English gold, silver and bank notes, and Portuguese silver at the generally accepted rate of 5,000 reis to the £1 sterling.

Trade.—The principal exports are bees' wax, india rubber, ivory, skins, hides and horns.

The imports are cotton and dry goods, furniture, corrugated iron and wood for building purposes. The future of Beira largely depends on the success of the gold mining operations of Massikessi and in those parts of Mashonaland to which the railway has access.

The exports for the first nine months of 1893, amounted in value to £17,600, and the imports to £75,440.

Communication.—The Castle and Union steamers both call at Beira fortnightly. Three other lines of steamers touch here. *See also* p. 6.

The Mozambique Company has organized a tri-monthly service between Beira and Sofala, Chiluān, &c.; Mashonaland *viâ* the Beira railway, and Sena on the Zambesi.

Railway and Telegraph. *See* p. 25.

Three small screw steamers, two paddle and one stern-wheeler ply on the river between Beira and Fontesville, the journey occupying about 4 hours.

There are also two tugs, 15 lighters and about 60 sailing launches employed in the river trade.

Climate.—From April to August fresh S.E. and South winds prevail; and from October to March N.E. to N.W. winds. The rains commence about October in the Zambesi, which is not far from here. *See* rainy season, p. 43.

About the middle of January the river is high, and keeps so until about the end of February when it begins to fall, reaching its minimum about the end of August, and remaining so until October or November.

During the stay of H.M.S. *Brisk*, June to August, the climate was very pleasant, maximum temperature being 80°, minimum 60°. The nights during these months were cold and very damp, heavy mists

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See plan, No. 1,003.

and fogs hanging over the river, and not clearing away until between 8 and 9 in the morning. p. 208.

Light Southerly to S.E. breezes prevailed but calms were frequent.

Tides and tidal streams.—The tidal streams are very strong, especially when the river is high, as much as 5 knots at springs at the junction of the Pungue and Buzio, and they have to be carefully guarded against when navigating the channel, especially after passing No. 6 buoy, for the flood stream sets very strongly on to the bank off Massique point, and vessels are swept on shore before the strength of the stream is recognized. A point and a half has occasionally to be allowed to counteract the effect of this stream and keep the vessel in the centre of the fairway.

At Beira the flood stream was found to run for only four hours during springs, and about five at neaps, and there was no time of slack water between the change of the streams. High water, full and change, about 5h. 10m., springs rise about 17 feet.

At Mapanda, about 43 miles above Beira, it was high water about six hours after Beira, the stream only running up for about one hour each tide; the rise and fall being about 18 inches at springs and 9 inches at neaps. This was during July, the middle of the dry season.

Above Beira the river is navigable for vessels of about 4 feet draught during high river (about January to May, being highest in March) for about 100 miles, and during ordinary low river for about 50 miles; but at times, during very low river, it is only navigable to Namacade point (midway between Mapanda and Fontesville), by canoes, except at near spring tides. Vessels of about 9 feet draught can ascend about 12 miles.

Railway.—Settlements.—Nova Ferreira, about 40 miles up the Pungue river, on the right bank, is a Portuguese military station. and so also are Mapanda and Sarmento. Mapanda is in about lat. 19° 23½′ S.

Fontesville or Chimago, situated about one mile below Nova Ferreira, is the starting point of the Beira railway into Mashonaland, The first section, 75 miles, was commenced in October, 1892, and finished in October, 1893. It is now open to Chimoio or Chimorias, 42 miles beyond, where the country is free from the tsetse fly. From thence, goods are conveyed by waggons to Umbali and Fort

See plan, No. 1,003.

p. 208. Salisbury. Passengers can make the journey in 4 days, goods from 2 to 3 weeks. It is proposed also to connect Beira with Fontesville both by rail and telegraph. The telegraph runs along the line of railway, and it is contemplated in the near future to extend it to Fort Salisbury, which will bring Beira into telegraphic communication with the World.

Buzio river, which discharges westward of Massique point, west point of entrance to the Pungue, is said to be navigable for vessels of 9 feet draught for a distance of 25 miles. It is said to offer better facilities for a railway than Beira, as at 2 miles above the entrance the land is elevated a few feet above the swamp, and is never flooded. Five miles up, the land is cultivated, with numbers of kraals and natives. A good depth of water, in places as much as 8 fathoms, was found for a distance of 10 miles up the Buzio. The native are peaceable and industrious, cultivating manioc, rice, and bananas.

There is a Portuguese military station half a mile above the village of Jobo, about 15 miles above the entrance. Some Portuguese colonists who have settled on the Buzio, have succeeded well with several kinds of vegetables. The sugar cane and grape vines are now being experimented with.

About 100 miles up the country is hilly.

The steam cutter of H.M.S. *Magicienne* in about October 1891 ascended to about 10 miles above Jobo, and could get no further for want of sufficient depth of water.

ZAMBESI AND SHIRE RIVERS.

(Page 17 to page 48 of this Supplement supersedes page 209, line 14, to page 222, line 23, of the Africa Pilot, Part III.)

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pp. 209–222.[1] The Zambezi is a river subject to great fluctuations of depth. During the rainy season it floods, the water rises from 15 to 20 feet, sweeping down with great rapidity, and fills all the valley.

At the height of the dry season the stream is reduced to channels of water winding between dry sand banks, with here and there shallows, which even a draught of 18 inches can scarcely pass. The

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[1] *See* chart, No. 1,577.

channel of one year or at times even of one week becomes a bank the next, and there is no permanence in either direction or depth of the navigable passages. pp. 209-222.

It forms a large delta, through the several mouths of which it discharges to the sea.

All of these have bars which similarly change in depth from year to year. At one period, one mouth is the deepest ; at another period, another.

To within the last few years the Kongoni mouth was considered the most practicable, but attention was in 1888 called by Mr. D. Rankin to the Chinde mouth, which, on examination, proves to be the best entrance and is now used by all vessels entering the Zambezi.

In the following pages the entrances will first be described, and then the characteristics and details of the river, and of its important tributary, the Shiré, which falls into the main river at about 110 miles from the sea.

ZAMBEZI DELTA.*—General remarks.—The Delta may be said to comprise the Melambe, Inhamissengo or Kongoni, East Luabo, Muselo, the Chinde, the Inhamacatiua, entered from the Chinde, the Inhamhona, and possibly also the Linde. The Chinde, which has a depth of about 18 feet at high-water springs, and the Inhamissengo, with about 3 to 5 feet less, are the best entrances to the Zambezi ; but these depths, as well as those on the bars of the other mouths, and also the direction of the best water, are subject to constant alteration, causing any directions that may be given to shortly become obsolete. The large body of water which runs out of the various mouths during the rainy season, and the continued heavy ocean swell so alter the positions of the several bars, and even cause islands to form and wash away, that the entrances are never two seasons alike, and should never be attempted without a pilot, or first sending a boat in to sound. During the southerly monsoon, the dry season, they are the most dangerous, *see* seasons, pp. 41–43.

The bars will probably have a maximum depth from the end of February to early April, when the river is in high flood, and a minimum depth from September to early November, especially the latter portion, the end of the dry season. Details of each bar are given separately. Vessels of about 10 feet draught, can ascend the

* *See* Admiralty plans :—Mouths of the Zambezi, No. 2,865, sketch survey of river Chinde, No. 1,421, plan of Zambezi and Shiré rivers, No. 1,577, and Admiralty charts, Nos. 1,810 and 597.

pp. 209–222. Delta about 35 miles, as far as Mchenga, 5 miles above the junction of the Chinde with the main stream, at all times of the year; beyond this, in February and early March, the same draught could possibly on emergency go up to Tete, about 300 miles, or to the rapids 2 miles above it; also up its tributary, the Shiré, but not without occasionally getting aground, and there is the possibility of being detained until the next rise of the river. It is not recommended for vessels above 5 feet draught to attempt either of these rivers, After March the river falls rapidly.

Vessels of 18 inches draught only can navigate to the rapids about 20 miles above Tete, or to the Murchison falls on the Shiré, at all seasons of the year; but with a very low river (November) there may not be sufficient water even for these. *See* inland navigation, (seasons), pages 37–39.

Aspect.—The land forming the mouths of the Zambezi is low, the tops of the trees nowhere exceeding from 50 to 80 feet in height, and the similarity of the appearance of the different mouths renders it somewhat difficult to distinguish them. The East Luabo, the main and straightest entrance, was formerly the most easily distinguished, from its being nearly 2 miles wide, whilst the others are mostly narrow; it lies also between two comparatively lofty and densely wooded points, the trees on which are remarkable (*see* view on chart 2,865), the light shewing between their straight bare trunks give them a resemblance to cliffs when seen from a distance; the bar, however, extends about 3½ miles off-shore.

The Chinde, with its tall flagstaffs and the houses at the Concession, &c., is now easily identified.

The Delta is but sparsely inhabited owing to a large portion of it being some feet under water when the river is in flood, especially at or near spring tides. Villages and clearings exist on the higher grounds, some of the dwellings being on piles; but it is not until the junction of the Chinde is passed that the land becomes higher and better populated and cultivated.

The lead is of much assistance when approaching the Delta of the Zambezi, the soundings decreasing from 20 fathoms at about 25 miles off, to 7 fathoms at about 4 miles, from which depth the

See enlarged plan of Inhamissengo entrance on Admiralty chart, No. 2,865.

soundings decrease regularly to the bars of the rivers, which are from 2 to 3½ miles off-shore. pp. 209-222.

The different entrances to the Zambezi will first be described.

MELAMBE MOUTH of the Zambezi lies 6 miles eastward of the West Luabo (which has not, as far as is known, any connection with the Zambezi), and 3½ miles westward of the Inhamissengo, of which river it is the western mouth. Its entrance appears to be choked with sand banks; it has not, however been examined.

INHAMISSENGO (KONGONI) MOUTH* is the mouth next eastward of the Melambe, midway between the west and east Luabo, and, with the exception of the Chinde, p. 32, is the best entrance to the Zambezi. It extends about 15 miles in a not very winding course to the northward, with depths of from 2 to 5 fathom; it then divides into two branches; Madredane, the eastern and navigable one, is a creek only 10 yards wide in places, and about 3 miles in length, at which distance it connects with the Zambezi; it is said to have a depth of two fathoms at low water, but the channel is tortuous and there are many snags in it. H.M. gunboat *Mosquito* passed through it in 1893, with some difficulty, owing chiefly to the overhanging foliage. It was by the eastern branch that the expedition under Dr. Livingstone entered the Zambezi.

The western branch, named the Doto, is very shallow and but seldom used; it enters the Zambezi opposite the Chinde.

H.M.S. *Mosquito* ascended this branch for about 5 miles in October 1893 where she anchored. From here, lake Sakassi and the village of Zuere on its west side were visited. The path is across swamps. The banks of the lake are high and well wooded, the water clear and good to drink. Fish were plentiful in the lake. It is apparently within a few miles of the banks of the Zambezi.

There is a boat channel within the bar, named the Inhangurue, which communicates with the main branch 3 or 4 miles from its mouth, but at times this channel is blocked up.* The *Mosquito* passed through in November 1894 (low river) in not less that 5 feet at low water.

Bar.—The Inhamissengo is fronted by sand banks and breakers to the distance of 1½ miles, at which distance they are connected by a narrow sand ridge, with depths of 2 to 5 feet at low water springs,

*See enlarged plan of Inhamissengo entrance on Admiralty chart, No. 2,865.

pp. 209–222. or 14 to 17 feet at high water springs, the greater depth usually being found during the height of the rainy season, or December to March. A steam vessel drawing 12 feet water has crossed the bar, which at times is possibly available for vessels up to 15 feet draught. In 1893, it was reported that there was a depth of 19 feet at high water springs. The buoys and light have also been removed, but the directions are retained here. *See* Chinde mouth, p. 32.

The settlements, created in 1881, at the south-east corner of Inhamissengo island, have been abandoned, since the diversion of trade to the Chinde.

Only one house, that of the owner of the Prazo, is now standing (1893) of the settlement of Conceiçao, 13 miles above Inhamissengo, but the gardens contain quantities of oranges and lemons. Guinea fowl and wart-hog abound, and also small leopards.*

Anchorage.—The most convenient anchorage in the offing for communicating with the shore is with the gap in the land bearing about North, in about 4½ fathoms, sand; but except in fine weather vessels should lie farther out, say in 7 fathoms at 4 or 5 miles from the shore. The current generally sets to the westward, causing vessels at anchor to lie broadside to the usual S.E. wind, and to roll a good deal.

Directions.—Vessels proceeding to the anchorage off the Inhamissengo should make the East Luabo first, unless certain of their position, as its entrance is more easily discernable from its much greater breadth. Having made that mouth, steer to the westward along the coast, keeping in 4 or 5 fathoms, until the entrance is identified, whence anchorage should be taken up as above directed. If wishing to enter the river, the services of a pilot must be obtained, or the bar, which is subject to alteration, examined before doing so. *See* Bar, above.

Within the bar the channel deepens. Pass the west point of entrance at the distance of one cable, and anchor off the settlement in about 3½ fathoms. In crossing the bar a probable westerly set must be guarded against. At low water the surf breaks right across the bar, and the channel cannot be distinguished.

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* Lieut. Carr, H.M.S. *Mosquito*, 1893.
See plan, No. 2,865.

Tides.—It is high water, full and change, at 4h. 30m.; springs rise about 12 feet. The ebb tide at springs runs 4 to 4½ knots off the settlement, and at low tide the river water is generally fresh. pp. 209–222.

EAST LUABO, known also as the Zambezi, is 1¾ miles wide in its entrance, and is the main outlet of the Zambezi river.

First Bluff point, on the western side of entrance, so called from its high straight trees standing very close together, and Hyde Parker point, on the east side of entrance, which from the view on plan No. 2,865, is a remarkable object, coupled with the wide entrance between them, afford the means of identifying it.

Bar.—The shallow water around the mouth of the East Luabo extends about 3½ miles seaward of the entrance. The sand bank from the east point extends nearly across the mouth of the river, leaving a passage about a quarter of a mile wide between it and the bank on the western side. The sea at low water breaks completely across the passage, at which time a great portion of the banks are uncovered.

The depth on the bar at low water springs was (1859) about 4 feet. Discoloured water is seen a considerable distance off-shore at times but on one occasion, in the month of June (1860), two days were occupied without finding a channel across the bar, which is said to be impracticable during the dry season.

The east bank has a few straggling villages, visited by the *Mosquito* in October 1894, that of Timbue has a considerable population; cocoa nuts and mangoes are plentiful here. The river within the bar has considerably altered from that shown on the plan. The vessel apparently did not attempt the bar.

Tidal stream.—The influence of the tides is felt about 30 miles up the river; *see* p. 34. The water is fresh down to the bar with the ebb tide, and in the rainy season it is fresh at the surface outside.

In the rainy season the river frequently overflows its banks at springs, but the waters do not remain up more than three or four days at a time.

MUSELO MOUTH, about 10 miles eastward of the East Luabo, and between it and the Chinde, has some sandy cliffs on its north-east side, which may assist in identifying it; about 10 miles from its

See plan, No. 2,865.

pp. 209-222

mouth it joins the main stream. The bar is situated about 4 miles off-shore, and when examined, some 30 years ago, was stated to be impracticable for boats even in ordinary weather, there being a heavy surf on the only spot where a channel appeared practicable.

The channel within the bar was examined by the *Mosquito* in October 1894, and was found to have but 3 feet at low water in one place (dry season). The vessel does not appear to have attempted the bar. The banks are thickly wooded and no villages were seen.

CHINDE MOUTH,* the main entrance to the Zambezi, is situated about 15 miles north-eastward of the Muselo entrance ; this branch is about 20 miles in length, between Foot point, on the south side of the entrance, and its junction with the Zambezi proper. Foot or Liberal point is low, swampy, and covered with trees about 50 feet high. On it is the Portuguese settlement of Chinde with the Concession westward of it.

Mitaone, its north point (outer beacon), is in lat. 18° 32′ 44″ S., long. 36° 30′ 25″ E.

Its entrance lies between sand banks and breakers extending about 2 miles seaward of Mitaone and Foot points, and has a bar three-quarters of a mile in breadth, situated 1½ miles from Mitaone point. This bar has a depth of about 6 feet at low water springs,† affording a depth of 15 feet at high water neaps and 18 feet at high water springs, but the depths and direction of the best water are constantly shifting, and therefore not to be depended on. It is imperatively necessary that the bar should be examined before entering.

Within the bar the depths increase to 3 and 4 fathoms at low water within Mitaone and Foot points ; abreast Foot point and westward past the settlement, the river is at least half a mile wide, gradually reduced to about 4 cables abreast the west end of Mitaone island, 3 miles above.

From thence, to about one mile above Sombo, or 13 miles above the entrance, the river is about one cable wide, with sufficient depth at all times for vessels that can cross the bar. Above this distance the river is much narrower, and the depths are only from 6 to 8 feet

* *See* Admiralty plan of river Chinde, with view, No. 1,421 ; scale, *m* = one inch.

† A depth of 4 feet only at low water springs in November 1894 ; but this was the end of the dry season ; *see* general remarks p. 27.

at low water in places. At its junction with the Zambezi, the bar has from 8 to 10 feet at low water. pp. 209-222.

Beacons.—Buoys.—Two small pole beacons are erected on Mitaone point, north point of entrance to the Chinde ; the outer one, 30 feet high, is surmounted by a white triangle, the inner one, 42 feet high, by a white disc with black centre ; these are supposed to mark the best water over the bar, and to be altered to meet any change. They must not be depended on.

Two buoys usually mark the channel over the bar, but they, as well as the beacons, are not to be depended on.

Intended light.—It is intended to erect a lighthouse on Mitaone point. The light is to be *fixed white*, and visible about 8 miles.

Pilot.—The services of someone acquainted with the state of the bar may possibly be obtained at the Concession, but too much reliance must not be placed in him.

Directions.—Anchorage.—The land in the neighbourhood of the Chinde mouth is low, and similar to that at the other entrances to the Zambezi, but on a near approach, about 5 miles, the single palm, if still standing, on Mitaone point will probably be made out, and also the somewhat conspicuous sand hills, 57 feet high, on the north side of Inhamhona river, 2½ miles north-eastward of the Chinde. A white flagstaff, 86 feet high. at the Concession is a conspicuous mark from seaward. *See* sketch on plan.

Having identified the entrance, steer in with the single palm, bearing N.N.W. ¾ W., anchoring in not less than 5 fathoms, about 3 miles off the entrance points. From this position, a boat must be sent in to sound on the line of the leading beacons, and to ascertain the best water into the river, failing to obtain a pilot.* Vessels can communicate by signal with the flagstaff at the Concession. The best time to enter is from three-quarter flood to high water.

There is good anchorage anywhere between Foot point and Luabo point spit 2 miles above, in depths of 2½ to 4 fathoms, good holding ground. Vessels should moor. Strong easterly winds render the anchorage off the Concession untenable for small craft, but at such times they can shift higher up.

* There are two wrecks on the bar ; 1894.
See plan, No. 1,421.

pp. 209–222.

It is probable that when the river is in flood or from freshets, and the water is being discharged from it with considerable strength, that the channel over the bar will be towards or through the bank extending eastward of Mitaone island; this was apparently the case in September 1894, when it was reported that a new channel had opened northward of the old one, with a depth of 17 feet at half tide; whereas in the dry season, when the stream is weak, the tendency is for the prevailing S.E. wind to heap up sand to seaward, and to force the channel in a more oblique southerly direction. This channel was nearly closed two months later.

Tides.—It is high water, full and change, in the Chinde entrance, at 4h. 30m.; springs rise 12 feet, neaps 9 feet. These observations were made in July. In September the neap tides were found to be very irregular, with a range of $1\frac{1}{2}$ to 3 feet. The Chinde is tidal throughout, the flood and ebb streams turning about 1 hour after high and low water at the bar, and running at the rate of $2\frac{1}{2}$ to $3\frac{1}{2}$ knots respectively, at springs.

Occasionally during neaps there is no perceptible flood stream.

Tides in the Zambezi, *see* p. 39.

To enter the Zambezi from the Chinde.—There is depth enough at all states of the tide for a vessel to reach Sombo, and one mile beyond; but if proceeding into the Zambezi she should time herself to reach Sombo about an hour or more before high water, as the river above has depths of 6 to 8 feet only in places at low water, and is very narrow. Vessels of about 150 feet in length once committed to the upper part of the Chinde must continue on into the Zambezi, as there is no room to turn. The bar abreast the junction with the Zambezi has 8 to 10 feet at low water and not less than 14 feet at high water neaps, with the large tree westward of old Chinde village bearing S.W. Thence the turn into the Zambezi northward is sharp round the spit extending from the north point, the channel between it and the bank in mid-channel of the Zambezi being only about 30 yards wide. The deep water in the Zambezi is along the eastern bank. The *Redbreast* (September 1890) anchored just above the junction in 4 fathoms, but had to shorten in when swinging to the tidal stream. These remarks apply to that time.

The two streams formerly charted as the Inhamiara and Inhámombe rivers on either side of Fremantle point, connect a few miles above their entrances. About a mile above this junction there are two branches. The southern branch is known as the Inhamacatiua, and it connects with the Zambezi.

See plan, No. 1,421.

H.M.S. *Mosquito*, in October 1893, entered the eastern mouth, from the Chinde, with a rising tide, and, proceeding by the Inhamacatiua, without difficulty reached the Zambezi at Juau, about 6 miles above the Chinde junction, thus avoiding Sombo. This route is said to be 1½ hours shorter than by the Chinde, but the depth was as little as 3½ and 4 feet in places. pp. 209-222.

The northern branch was also ascended for some miles, to just above the village of Samakota ; here the stream nearly dries at low water springs, and the trees overhang the curves which are very sharp.

The western mouth was also examined, and up to its junction with the eastern was found to be deep and sufficiently broad in all places for the *Mosquito* ; by this stream, the flats in the mouth of the eastern mouth are avoided.

(The Inhamhona may apparently be reached from the Inhamiara, northward of Mitaone island, but this locality has not yet been examined.)

PORT CHINDE settlements.—The Portuguese settlement of Chinde is established on Foot point, with barracks, flag staff, look-out house, custom house, and a detachment of soldiers, black, under a commandant. With the British Concession it forms now a large European settlement.

Westward, and adjoining the settlement, is the British Concession, with flag staff, buildings, &c. It has a river frontage of 437 yards and a breadth of 273 yards. Considerable improvement has been effected here since it was made over in 1892 ; a portion of the marsh has been drained, and groins built to protect the foreshore, and an attempt, unsuccessful as yet, to create a small dry dock. The shore line at the Concession is said to be continually falling away.

A representative of the Administration resides here, who has under his orders a guard of soldiers. A portion of the Concession is allotted to British trading companies.

It is comparatively healthy and a short stay here frequently benefits people who have suffered from malarial fever in the interior. This is partly owing to the sea beach and bracing sea breeze.

Chinde, and Chiromo on the Shiré may be considered the head quarters of H.M. gun vessels *Mosquito* and *Herald.*

See plan, No. 1,421.

pp. 209-222. The village of Sombo is situated about 12 miles above Foot point, and the old village of Chinde 20 miles above, at the junction with the Zambezi.

Trade.—At present there is but little trade at Chinde, beyond transport to British Central Africa and to the Zambezi. In the year 1893, six new steamers and a number of steel barges were put together at Chinde, and three more steamers were to be added in 1894. There are three British and one German firms doing steam transport on the Zambezi, with their head quarters at Chinde. At least one steamer leaves Chinde every week for the interior.

The journey from Chinde to Chiromo occupies about six or seven days ; to Katungas occupies two days more. For river steamers, *see* p. 62.

The British exports in 1893, from up river, were valued at £22,139, principally ivory and coffee ; the imports, at Chiromo, £44,562, chiefly soft goods, hardware, arms, spirits, &c.

Supplies.—Dock.—Provisions are fairly abundant. There are two tugs at Chinde and a small dry dock is in progress. There is a small patent slip at Sombo.

Mails.—Mails reach the Chinde about every fortnight ; one monthly from Zanzibar, the other monthly from the Cape of Good Hope, brought by a tug from Kilimán, connected with the Union Line.

The German East African Line call here also monthly, and there is also a trading steamer belonging to Messrs. I. T. Rennie & Sons, from Natal every three weeks, which vessel enters the river. *See also* p. 6.

Telegraph.—Chinde is connected with Kilimán *via* Sombo, where it crosses the river. The telegraph line from Sombo is led along the left bank of the Chinde and Zambezi, as far as the Leak, there it forks,—one branch following the right bank of the Ziu-Ziu to its mouth at Inyamgona point ; from thence it continues along the left bank of the Zambezi to abreast Tete, thence across to Tete. Also from Inyamgona point across to Sena. The other branch continues along the left bank of the Shiré to the Portuguese settlement at the mouth of the Ruo. Blantyre is also connected with the telegraph.

The work is in progress to connect fort Salisbury with the British Territory north of the Zambezi, *viâ* Tete, and will shortly be completed.

See plan, No. 1,421.

Signals.—From the flag staff at the Concession, signals can be exchanged with vessels at anchor outside the bar. pp. 209 222.

INLAND NAVIGATION.—General remarks.—The Zambezi is only navigable by steamers of very light draught of water, at all times of the year; at low river anything over 18 inches draught may ground in places. The navigation is blocked by the rapids some 20 miles above Tete, or about 320 miles from the sea. Its most important tributary, the Shiré, is also navigable for the same light draughts to its rapids, about 300 miles from the sea, and about 190 miles above its junction with the Zambezi.

Vessels of about 10 feet draught can probably ascend the Zambezi by the Chinde mouth at all times of the year as far as Mchenga village on the east bank, about 5 miles above the junction of the Chinde with the Zambezi, and 25 miles from the entrances, as stated at pp. 27, 28. H.M.S. *Stork*, drawing 11 feet, ascended to Mchenga in July, the dry season, by the Chinde; here she was stopped by a bar only passable at high water, but as the river appeared to be still falling, it was not deemed prudent to pass above it. The river was found to afford only just water enough for her loaded boats a few miles above; and many similar bars were met with before reaching Morambala on the Shiré, about 150 miles above the vessel. H.M.S. *Redbreast*, drawing 13 feet, ascended to within a short distance of Mchenga in September 1890, but had great difficulty on account of the narrowness of the Chinde and the sharp turns. Vessels of 4 feet draught can usually ascend as far as the Dutch house, lat. 17° 55′ S.

General directions.—Owing to the constant and rapid changes which occur in the navigable channel of the Zambezi, no permanent directions of any value can be given; islands form and wash away, and channels which have been known to exist at one time, may be found to have disappeared a month later; the navigable channel bears no proportion in the dry season to the width of the river, which varies, below Sena, from a half to over three miles, and is in places studded with islands. The channel crosses and re-crosses from bank to bank, rendering the distances traversed in many places quite double to that shown by the chart. In these crossings the channel is always shallower than where it takes the direction of the banks, but the worst portions are usually pretty clearly defined. In calm weather there is a peculiar boiling up of its water, and when

See chart, No. 1,577.

pp. 209–222. the wind is blowing up the river, as it usually does, the ripples on the shallows are more marked than in the deeper water, and similar ripples or breakers mark the edge of the shallow bank above. These ripples are almost the sole guide of the pilot.

As a general rule, by keeping on the outer side of the bends of the river, and avoiding the points, most of the shallow places will be avoided, as in all river navigation. At a crossing, keep well up towards the upper sand bank, more especially when descending the river; the vessel may ground on this bank with impunity, as the current will wash her off, but should she ground on the lower bank it means hours lost in laying out anchors and heaving her off. In this case her head must be got up stream as soon as possible.

Commander H. J. Keane, late of the *Herald*, remarks:—"The constant change is not confined to the river bed; the banks are continually being fretted away by the combined action of the wind and water, so that huge masses of earth are constantly falling into the stream, to be carried away and deposited in some position that will astonish the navigator, who, steaming with a certain amount of confidence down a channel that he has found to be fairly permanent, suddenly discovers it *blind*, and finds himself aground. On a fine calm day the experienced eye may detect it before too late, but such knowledge is only to be obtained by hard experience of a trying description."

Snags are plentiful in the Chinde, Zambezi, and Shiré, and are a constant source of anxiety, as each year's flood brings down snags, and to add to the difficulty if they are 2 feet below the surface there is no sign of them. They are more numerous in the Shiré above Chiromo, than below.

In the rainy season.—During the greater rains, January to March, it is possible for vessels of about 5 feet draught that can steam 10 knots, to ascend to Tete on the Zambezi, or to Katungas village on the Shiré, each about 300 miles from the sea, but probably not without grounding, as the channel is never two seasons alike. There is the chance of being detained until the next high river should the vessel get aground. *See* remarks on the Shiré at p. 55, and the Zambezi above the Shiré junction, p. 48. In early March, the river will be highest, about 20 feet above low river, after which it usually falls rapidly. *See* height of river and rainy season, pp. 41–43. In addition

See chart, No. 1,577.

to the risk of grounding, for the reason given above, vessels have to contend against a current at times of from 4 to 5 knots an hour. In the Lupata gorge, some 60 miles below Tete, it would be stronger during the first rush of the floods, as its rate there is 3 knots in the dry season, but the water is deep. pp. 209–222.

In the dry season.—The general character of the waterway during the dry season, after June, is comparatively deep reaches, separated by shallow bars, the position of and depth on which varies from season to season, depending on the lowness of the river and the effect of the previous flood. Thus, while at some seasons a vessel of 3 feet may possibly pass, in another 18 inches is none too little.

More or less permanent shallow places are found in the Zambezi, even nearly down to its junction with the Chinde, where there may not be more than 2½ feet, but more particularly between its junction with the Shiré and Tete. From the month of August to early November, for about 15 miles above the junction, and again in a portion between Sena and the Lupata gorge, the river is hardly navigable for anything drawing over one foot. The flats in the Zambezi above the junction of the Shiré are avoided by ascending the Shiré to the Ziu-ziu, a connecting channel between the two rivers, and re-entering the Zambezi by it.

The Shiré also, particularly in the Elephant marsh northward of the Ruo, is shallow, the depth being not more than 2 feet at the same period. *See* pp. 55 and 58.

The early part of the dry season, April and May, naturally affords more water in the channels than during the other months of that season, but these are the most unhealthy.

Tides.—Current.—The tidal rise in the mouths of the Zambezi is about 12 feet at springs ; this amount is reduced to about 5 feet at Mchenga, situated about 25 miles above the entrances, and 5 miles above the junction of the Chinde, and the time of high water at that place is 2¼ hours later, or 6h. 50m., full and change.

At about 5 miles above Mchenga there is no rise of tide, but the effect of the flood tide in checking the stream coming down the river is sensibly felt for many miles above, probably as far as Expedition island. Above this there is a constant down stream, varying

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See chart, No. 1,577.

pp. 209–222.

from 3½ knots when the river is in flood, maximum about February and March,* to 1½ to 2 knots in the dry season, the minimum probably from end of August to early November.

In the lower Shiré the stream runs from ¾ to 1½ knots in the dry season; and in the upper Shiré, above the falls, less. *See* tide gauge, p. 42.

Pilots.—The only pilots on the river are natives who have served on the African Lake Company's steamers. The navigation is entirely by the eye. These men require careful watching as they have but little idea of the strength of the stream or the turning capabilities of the vessel.

Anchorage.—Vessels or boats seeking temporary anchorage are recommended to anchor usually well out in mid-stream in preference to near the banks; but in early May a good look out must be kept for the large masses of grass, resembling floating islands, which are brought down by the stream, especially in the lower part of the Shiré, as not only are they liable to trip the anchor, should one foul the cable, but there are often snakes among the grass. At this time anchorage should be sought well under the lee of a bend.

Anchors should be sighted about every 10 days when the river is in flood, otherwise they get buried.

Tracking the boats along the river banks is possible for short distances in most places above the Delta during low river.

Supplies.—Fowls and game are fairly plentiful; goats may occasionally be obtained, but fruits and vegetables are scarce. On the Shiré, goats and fowls are to be procured at times, but they are very scarce. Rupees are well understood by the natives, but white and blue calico, coloured handkerchiefs and beads, are good articles for barter. The stations of the African Lakes Company afford the best supplies. The river water, after being filtered, is always good for drinking; but it should be first boiled.

Wooding stations.—On the Shiré wood can be supplied at Masanji, just below port Herald, lat. 16° 49′ S., and at Chiromo the naval depôt. Above that wood is cut and sent off as required, when the river is navigable.

* Livingstone states that at Tete, a few days after the first rush of the floods, the stream returns to its usual rate of 1½ to 2 knots.

Firewood is supplied to H.M. gunboats by the British Central African Administration. pp. 209-222.

Masongwei, the Dutch house, supplies wood for fuel as it is cut on the Shupanga side (Zambezi).

Produce.—The country is capable of producing large quantities of wheat, maize, cotton, various kinds of vegetables, and oil seeds, &c. Quantities of ivory are brought to the trading stations. The forests of Shupanga and others contain valuable woods, such as rose-wood, ebony, lignum vitæ, &c. About four miles northward of Tete several seams of coal were seen by Livingstone, one of which was 25 feet in thickness; near Chiceva above the Kebrabasa rapids, coal crops out of the face of the cliffs. During the last few years coal has been discovered in the valley of the Muarese or Mirarazi river, some 7 miles below and northward of Tete (*see* p. 52). The Delta is well suited for sugar plantations. In the Shiré valley, semsem and ground nuts grow readily, and plaintains in abundance; the soil is also suitable for the growth of sugar cane, and in the Shiré highlands, coffee, fruit, vegetables, &c., grow in abundance.

Natives.—The natives near the banks of the Zambezi are usually friendly and ready to trade, but opposite Tete the country away from the banks of the river is in a very insecure state.

Height of river.—Seasons.—The first rise in the Zambezi, after low river, begins with the lesser rains in November (*see* rainy season, p. 43); it attains its maximum about the end of December or the beginning of January; 13½ feet (the maximum) was registered at Tete on 17th January 1889. The river then falls a few feet, until succeeded by the great rise, which takes place after the river has inundated the interior to a similar manner to the overflow of the Nile, and is at its highest at Tete in March, amounting usually to about 20 feet above low river, but every fourth year (the natives state) it rises about 30 feet. The rise is sudden, and the water is highly discoloured and impure, but still good for drinking purposes, and the current runs down at the rate of 4 to 5 knots, but in a very few days after the first rush, the current resumes its usual rate at Tete, from about 1½ to 2 knots. The Zambezi water at other times is almost chemically pure. *See* remarks on Zambezi above the Shiré, 1894, p. 48.

In the Shiré, off the mouth of the Ruo, 6th January 1862, the river had only risen 4½ feet above its level in the preceding June,

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See chart, No. 1,587.

pp. 209–222.

1½ feet of which occurred on that day, but the November rains had only lasted 6 days. The *Pioneer*, drawing 5½ feet, was detained here 5 weeks to 7th January, through the water not rising sufficiently to allow her to pass down over the flats near the Elephant marsh.

The dry season of 1890 was marked by what was thought to be an exceptionally low river, but the flats in the Zambezi were passed by vessels of 2 feet 4 inches draught, and the Shiré presented no real difficulty to navigation. The early part of 1891, however, was much worse ; it was only with great difficulty H.M. gunboats, drawing 2 feet 4 inches, reached port Herald at the end of October; here everything was landed, and the vessels drawing only 2 feet had to be hauled over the flats by warps to reach Chiromo. Nor was this all, the Shiré below Pinda was quite unnavigable, and the channel known as the Leak was a rushing torrent. A narrow channel called Mjassa with 4 feet water, was discovered, joining the Ziu Ziu ; this channel enabled the vessels to join the Shiré again near Pinda.

In February 1891, at Katungas, the river was falling one inch daily from 18th February for about 3 weeks, but the Zambezi and Lower Shiré were flooded on 17th March. The Zambezi was still high on May 12th, but water was falling. *See also* p. 58.

Tide gauge.—Lieut. Carr, of the *Mosquito*, has erected a tide gauge at Chiromo, p. 57, which affords information on the depth in the river in the approach to and above that place. The preceding remarks agree fairly well with these results. Its zero corresponds to normal low river. The following applies to the rise and fall for 1893–94.

A height of 3 feet 9 inches on the gauge shows there is a depth of 2 feet in the approach to Chiromo from below, and 5 feet 9 inches that there is a depth of 2 feet to Katungas.

Port Herald is flooded when the gauge shows 10 feet 9 inches, and the northern part of Chiromo when it shows 15 feet. All of Chiromo would be flooded at 17 feet.

On December 1st the water stood at zero, and remained practically so until the 10th, whence it rose rapidly to 3 feet 6 inches on the 13th, falling as suddenly to 1 foot 6 inches, where it remained until 26th, when there was a similar jump to 4 feet, falling again suddenly.

See Chart, No. 1,577.

On 1st January the gauge showed 1 foot 9 inches, gradually rising to 4 feet on 3rd February, when a sudden rise set in, the gauge registering 11 feet 9 inches on 8th February. Thence it fell gradually to 4 feet 6 inches on 28th of that month. pp. 209-222.

A large and abnormal rise then came, caused by the heavy rains in the Blantyre district (and not by water from Nyasa), the gauge showing 15 feet 7 inches on 20th March. Thence it fell to 6 feet 6 inches on 3rd April, and (with the exception of a sudden rise of 3 feet between the 10th and 13th) gradually fell to 4 feet 6 inches on 16th May.

The register was not continued, but the water would stand at about that height for some time, and then gradually fall away to low river, about October.

Rainy season.—Rainfall.—The valley of the Zambezi is reached by the lesser rains late in October, when the sun is passing southward; these diminish or cease altogether in December, when at times there is a partial drought. The heavy rains usually begin when the sun, returning northward, is in the zenith, about the middle of January, and continue to the end of March or the beginning of April. There are light rains in the months of May and June. The remainder of the year is dry.

The rainfall near Tete is from 33 to 36 inches, though as little as 19 inches was registered in one year. In the Shiré highlands it amounts to 50 inches; and at Bandawé, the head station of the Free Church of Scotland, on west shore of Nyasa, it is about 85 inches.

Winds.—The wind blows from the southward, up river, nearly all the year round in the day time. *See* Winds off the coast, p. 69.

Climate.—April and May are probably the most unhealthy months in the Zambezi and Shiré, when, the rain, having ceased, the action of the sun on the decaying vegetation is most active, producing deadly exhalations. February and March, the height of the rains, and November, the period of greatest heat, are also very unhealthy. The Delta of the Zambezi and the lower valley of the Shiré, particularly in the neighbourhood of the Morambala and Elephant marshes, bear the worst character, and the mosquitoes are a terrible plague. The upper valley of the Shiré, above the falls, and lake Nyasa are less unhealthy, but the climate is always trying to

See chart, No. 1,577.

pp. 209–222. Europeans. In the Shiré highlands, from 3,000 to 5,000 feet above the sea, where are the chief mission stations of the Established Church of Scotland, the climate is healthy and well suited to Europeans; it is used as a sanatorium for those requiring a change from the mission stations on the shores of Nyasa. Below the level of 3,000 feet the climate deteriorates.

The report from H.M.S. *Herald*, 1891, on the health of the several places is as follows:—Katungas, a very unhealthy locality. Chiromo, very fair. Vicenti, severe attacks of malarial fever at all seasons. Chinde river, no marked unhealthiness, but chills are dangerous.

The Chinde was healthy and free from fever in September and October 1890; maximum temperature 75°, minimum 68°. *See* also Chinde, p. 35.

Temperature.—At Tete, on the Zambezi, the greatest heat is in February, 103° being registed in the shade; it is coldest in July, about 72°, and in November it is about 84°. Between Tete and the coast, in February, the temperature is about 98° at noon, and 80° at night. On the Shiré, below the Murchison falls, in September it is about 100° in the shade. At Blantyre, in the highlands, the average temperature is 50°, on several occasions it has fallen below 40°, and once it was registered 30° (July). At Bandawé, west shore of Nyasa, the maximum is 85° (November), minimum 60° (May); the extremes are 100° and 54°.

Personal care of health.—Flannel should be worn next the skin by day and night; if other clothes are worn during the day the change to flannel should be made before sunset, as there is a considerable lowering of the temperature during the night, especially about July, the coldest time of the year.

The head and spine should be effectively protected; the former preferably by a well ventilated pith hat; the spine should be protected by an extra thickness of flannel down the back of the shirt; flannel waist belts are recommended.

Sleeping in draughts, opposite a windsail or open port, should be avoided, or a chill may result, followed perhaps by fever. As a rule, sleeping on deck is not recommended, but if indulged in the whole body should be well covered up, and exposure to dew especially avoided. Damp clothes should be removed as soon as possible.

See chart, No. 1,577.

In malarious regions mosquito curtains are a great protection, beside acting as a protection against noxious insects, and they minimise the danger of exposing the body during sleep; moreover sleep is scarcely possible in some portions of the river, more especially near the swamps in the Shiré, without such protection. pp. 209–22.

The three or four hours before sunrise are those in which precautions are most needed on account of the liability to chills; everyone should be under cover at that time. It is just then, when temperature has reached its minimum, that sleep is most refreshing.

Excess in eating and drinking should be avoided; all meat should be well cooked, the drinking water filtered before use. The river water both in the Zambezi and Shiré is perfectly good; the water, when the rivers are in flood, is turbid, and if left to stand, throws down a certain amount of deposit, but it is always good when filtered. Water from wells should be avoided, but if used should be boiled. The practice of freely yielding to the sensation of thirst is to be deprecated, as leading to excessive perspiration, which saturates the clothing and predisposes to chill.

Extreme moderation in the use of spirituous liquors is earnestly recommended. Active employment is necessary for everyone employed in malarious rivers, as fever almost invariably attacks first those who lead a sedentary life.

Quinine, in two-grain doses, three or four times in the twenty-four hour, in notoriously malarious districts, is recommended.

These are the most effective measures against fever.

Sir John Kirk remarks :—"The best rule for health for men employed afloat in the Zambezi is to go to bed early, avoid chills at night, have a cup of hot tea, coffee, or cocoa in the morning before exposing themselves on duty on deck in the cold morning mists, which chill you to the bone, and on no account permit spirits to be drunk in the middle of the day. Sunset is the time for the men's allowance. Remember that mosquitos are in millions on the Shiré. I would always anchor in the stream clear of the shore."

Aspect of river.—Settlements.* (Continued from p. 35.)—The banks of the various mouths of the Zambezi for the first 10 or

* Approximate distances from the sea of the most important places will be found on p. 60.

See chart, No. 1,577.

pp. 209–222.

15 miles are of much the same character, being low and thickly covered with trees, the greater portion of which are mangrove jungle. At about the junction of the Inhamissengo with the main stream the pandanus or screw palm trees begin, many so tall as to resemble steeples; guava and lime trees are also abundant, many huts peep out between the bananas and cocoa-palms on the west bank, standing on piles a few feet above the ground, as considerable portions of the land in the rainy season towards spring tides are overflowed for three or four days at a time. The soil is wonderfully rich, and rice and many kinds of vegetables are grown in abundance; the whole of the region between the junction of the Inhamissengo and Mazaro, some 60 miles in length by 50 miles in breadth, is very fertile and well adapted to the growth of sugar-cane.

Chinde and Mchenga villages.—On the east bank, at the junction of the Chinde, are the villages of Chinde and Maruga, one mile apart; 5 miles above the latter is Mchenga village.

Above the junction of the Chinde with the Zambezi, the western bank abounds in cocoa-nut palms, and is somewhat higher than the eastern one, which is sandy; the banks of the river continue mostly of sand, with but few trees, until within about 20 miles of Maruro, and it is possible to track boats in most places.

Nyangombi, on the east bank, is a plantation, some 20 miles below Maruro, in about lat. 18° 21′ S.; it was visited by Commander Hyde Parker in October, 1849, in the boats of H.M.S. *Pantaloon*.

Mazaro (meaning the mouth of creek), about 80 miles from the sea, in lat. about 18° 4′ S., is situated at the mouth of the creek (Mutu), which, during high river, about February or March, admits of the passage of boats from the Zambezi to the Kwa Kwa or Kilimán river (*see* Mopea, p. 47); during the dry season the bottom of this creek or canal, about 30 yards wide, is about 16 or 17 feet above the level of the Zambezi. The Barabanda, about 5 miles below the mouth of the Shiré, also connects the Kwa Kwa with the Zambezi during the same period.

Abreast Mazaro the Zambezi is about half a mile wide, and the view is a magnificent one; the river is studded with islands, the sides of which are clothed with grass and shrubs, with many a creeper and convolvulus. On the opposite bank is the Shupanga

See chart, No. 1,577.

country, well wooded, and the home of the monster baobabs, many of enormous thickness. pp. 209–222.

At Maruro, situated just below Mazaro, the bank of the river has washed away considerably of late years; in 1884 a house was washed away by the encroachment of the river, which, in 1882, was 800 yards from the bank. Mopea is considerably nearer the river, than formerly, and it is believed that the time is not far distant when it will be on the banks of the Zambezi.

Vicenti is situated about 4 miles above Mazaro.

The wind usually blows up the river, particularly from May to November, the south-west monsoon period.

Mopea and Marendene.—Mopea is situated nearly 3 miles from the left bank of the Zambezi, on the Kwa Kwa or Kilimán river, about 80 miles above Kilimán town, and is in connection with it by telegraph, *viâ* Sombo.

A portion of the Kilimán trade with the Zambezi goes *viâ* Mopea. In the dry season there is just enough water at Mopea for the smallest canoes; at this time the goods brought up from Kilimán in lighters and canoes have to be unloaded at Marendene, a few miles below Mopea, where there is deeper water in the river, thence conveyed by porters to the banks of Zambezi, a distance of about 6 miles, either to Vicenti or to Mazaro, whence the goods are distributed by river steamers or canoes to the trading stations up river. The transport from Kilimán to the Zambezi occupies from 3 to 5 days.

Shupanga is situated about 8 miles above Mazaro, on the opposite bank of the Zambezi. In the forests at Shupanga the Mokunda-kunda tree is found; it makes good boats' masts, and yields a strong, bitter medicine for fever; the Gunda trees here attain an immense size; its timber is hard, and the large canoes used on the Zambezi and Kwa Kwa, capable of carrying 3 to 4 tons, are made of its wood. India rubber, calumba root, and indigo are plentiful in the district. Wood for fuel is collected here; the African ebony and lignum vitæ; the latter of which sometimes four feet in diameter, are the most suitable. At Shupanga lie the remains of Kirkpatrick, of Owen's surveying expedition of 1826, and of Mrs. Livingstone, who died here in 1862. The immense baobab

pp. 209–222. that formerly shaded the graves has now fallen. Some 5 miles inland are the Shupanga hills, from 300 to 400 feet in height. The country abounds with game. For about 2 miles above Shupanga, the west bank is rocky and steep, with a few rocks at a short distance from it. Above this both banks are about the same height as below, and are about 20 feet above the river in July.

The Zambezi above the junction of the Shiré.—General remarks.—Between Shupanga and Sena, the river is exceedingly interesting and picturesque; it is also considerably wider than below, and studded with islands, dividing the river into several channels, all of which are shallow. (Livingstone's steam launch was constantly aground here when going up in August.)

That portion of the river between the mouth of the Shiré and about 20 miles above, is only available for light boats in the latter part of the dry season; the best route then is to proceed up the Shiré a short distance, to the Ziu Ziu, thence by that stream back to the Zambezi and up to Sena; the Ziu Ziu is reported to be free from sand banks.

The Zambezi is also very shallow in places between the Ziu Ziu and Tete, the river being 3 miles wide in places, consequently the water is spread over a great width of sand bed, with reedy islands between the channels; from September to early November, the period when the lesser rains begin, one portion of the river between Sena and Lupata is hardly navigable to anything drawing over one foot.

The following information relating to the Zambezi, above the junction with the Shiré, has been received from Lieut. G. S. Carr, commanding H.M. Gunboat *Mosquito*, 1894. This is supplemented by a few remarks of Dr. Livingstone, where the ground is not covered.

Depths.—Above Senora Maria's (situated about 3 miles below the entrance to the Shiré, on the Zambezi) the channels become somewhat intricate and very winding, but there was plenty of water on the 26th January when H.M. Gunboats passed up.

Kaia (lat. 17° 39′ S.).—Here there is a substantially built brick house with corrugated iron roof (painted red). It belongs to

Sr. J. Liena, who it would appear does a fair amount of trade in ground nuts and produce generally. pp. 209-222.

Between Kaia and Casquetis, about 8 miles above, the water shoals a good deal and it is at this part that the river becomes blocked during the dry season.

At Mutarura (Inyamgoma point), west point of the entrance of the Ziu Ziu, there is a wooding and trading station belonging to Pereira Dulio Weire & Co., who have built a large stone house at the summit of a small hill.

Wood can be obtained here, and there are generally a few natives working as goldsmiths, turners, &c. Mutarura, owing to its greater accessibility takes almost all the trade which formerly passed through Sena.

Sena, one of the principal Portuguese stations, is situated on a low plain on the west bank of the Zambezi, with some detached hills in the background. It is now quite unapproachable except at very high river, and it is preferable to lie at Nyassereri, 6 miles above, to visit the town. Dr. Livingstone (in August) remarks: "being unable to take the launch up the shallow channel in which Sena stands, we anchored at Myaruka, 6 miles below, and walked up."

Sena has greatly fallen away, even since last visited (May 1893). The streets are all overgrown and the whole town gives one the impression of desolation and decay.

The fort is badly in need of repair. *See* telegraph, p. 36.

Nyassereri.—The road from Nyassereri to Sena is good, except after heavy rain, when about 1½ miles of it is converted into a swamp. The fort at Nyassereri is falling into decay.

Wood can be obtained in small quantities by arrangement with the natives, but as the locality belongs to the Companhia da Mocambique, it is necessary to ask permission from the manager before cutting the wood. From Nyassereri to Inyakarenga, 5 miles above, the river improves there being better water throughout; snags, however, demand attention.

Above Inyakarenga the river rapidly widens, but it is thickly studded with islands and navigation is difficult to about 10 miles above Guengwe (somewhere above Maria Pia, lat. 16° 14½′ S.). In

See chart, No. 1,577.

pp. 209–222. fact this is about the most difficult part of the whole river to pilot through.

The scenery improves. The banks are higher, the hills on each side form a picturesque background and both sides are thickly wooded and abound with game, guinea-fowl, and pigeon. Between Inhacarenga and Guengwe there are some stockaded tax-collecting stations, namely, Shimbwa, lat. 17° 12′ S.; Shimjarra, Nkuesa, and Maria Pia, before mentioned.

These positions, locally knows as "*Aringas*" are seemingly used as safe resting places for boats to stop at when the country is in a disturbed state.

Above Maria Pia the river begins to get narrower and deeper as the Lupata gorge is approached.

Shigogo is situated below the gorge.

Lupata gorge.—The gorge is a natural cutting through or between the range of hills on either side, into which the river is compressed into a narrow but deep channel.

The scenery is very fine, having very much the characteristics of the Cumberland lakes. The current was very strong (February) certainly over four and a half knots, and in some places more. H.M. gunboats going at full speed were in some places only barely making headway. This was probably due to a flood as the river had risen 4 feet during the previous night.

A strong current sweeps round the little rocky promontories of Chifura and Kangomba, forming whirlpools and eddies dangerous for the clumsy native craft which are tracked past with long ropes; heavy laden canoes take two days to track through the gorge. The currents above the gorge are stronger than those below, probably running about 2 knots at this season, August, that below being assumed to be about 1½ knots. Dr. Livingstone remarks: "The current ran about 3 knots and the launch steamed through with ease."

Sungo.—Immediately above the Lupata gorge on the east bank is the Aringa of Sungo. Here is a small fort with 14 Goanese soldiers. A small stock of coal is kept here for the use of the Portuguese gunboats.

See chart, No. 1,577.

From Sungo to Tete the passage is easy and the channel deep, in some places 30 feet for 2 or 3 miles together. pp. 209-222

At Masangano there is a fort strongly constructed of stone and about 200 feet long on its river face.

Luenya river (lat. 16° 25′ S.).—An attempt was made to proceed up this river, but about 2 miles above its confluence with the Zambezi it was blocked by large sandbanks, with no water sufficient for the ship to pass, though every portion was sounded out. This was all the more provoking as the natives informed me (Lieut. Carr) that a few miles on, the river narrowed and became deep, and from the point where the *Mosquito* grounded the narrows could be seen.

Muarese river.—Above the Lupata gorge, on the east bank, and about 7 miles below Tete, is the Muarese or Mirarazi stream; coal has been found in the valley through which it discharges into the Zambezi. The country inland here is very insecure.

Tete (or what remains of it) stands on a succession of sandstone ridges on the right bank of the Zambezi, which is here about half a mile wide. Shallow ravines, parallel with the river form the streets.

The mango tree flourishes here and the fruit is plentiful between November and March.—(Livingstone.)

Whatever Tete may have been in Dr. Livingstone's time it has sadly fallen away. Out of the sixty or so houses constructed of stone and brick, barely a dozen are in a state of repair. The streets are full of grass, the bridges over the little streams have fallen in, there are barely a dozen Europeans in the place, and everything seems to have gone to wreck and ruin. There are three forts, two in the last stage of decay; the military force consisting of a captain of Infantry and from fourteen to twenty soldiers, all Goanese. *See* telegraph, p. 36.

A certain amount of gold (alluvial) comes from Mascowe some hundred miles distant, the quantity brought in averages about one hundred and fifty ounces a month during the season (December to February). Some ivory also is brought in but the trade in it is being diverted to Blantyre.

See chart, No. 1,577.

pp. 209–222.

Wood is procurable but rather high in price. There is none kept in stock. (In future one hundred yards will be kept here for H.M. gunboats exclusively.)

The water in this part of the river is very turbid at this season (January to February) and it is advisible to distil sufficient water at the end of each day's run for the needs of the morrow, as filtration appears quite insufficient, the water being full of suspended matter though doubtless pure otherwise.

The supply of drinking water for Tete is mainly drawn from a well in an island about a mile distant but is not clear or pleasant looking.

Refubwe river, opposite Tete.—**Coal.**—This river was explored as far as Inyamakaze (Diorite rapids) where progress was stopped by a reef of rocks and a cataract.

The river is very narrow and the current strong and the bottom soon becomes stony and dangerous to ground upon. There are several large villages on the south bank. Close to Inyamakaze is a large coal mine and the river being navigable up to that point the coal could be easily transported to Tete in barges for shipment. No attempt is being made to work the mines and so far as could be ascertained none of the Portuguese steamers had ever ascended the river.

This coal when tried on board H.M. gunboats gave the most unsatisfactory results, no doubt due in a great measure to the form of furnace, but it does not seem to be adapted for steaming purposes. Possibly when coal is obtained some distance from the surface the quality may improve. (The Consular Report, for 1894, states that it is reported to be of fair quality, *see* p. 69).

Broma.—Above Tete the country begins to be more hilly and the river is narrower and in some places 60 feet deep. At Broma (lat. 16° 2′ S.) is the mission of St. José. A very large stone house is in process of construction at the summit of a small hill about 150 feet high. Here there are four priests and five sisters of charity. The house is quite the largest in the whole district of Zambezi, its dimensions being 127 by 60 and 50 feet high. At the foot of the Broma hill is the little church and close by it the house appropriated to the sisters and their little girl pupils. Both just above and below Broma there are rocks in mid-channel, but ordinary care is all that is necessary to avoid them.

See chart, No. 1,577.

Sanguru or Panzo as it is generally known has a fairly large Aringa (stockaded station) and stands on the south side of the entrance to the river Mavusi. The entrance is 45 yards broad and about 7 to 10 feet deep (February). pp. 209-222.

Freshets.—Caution.—While H.M. gunboats were lying here a strange thing occurred, the knowledge of which may prevent future accidents of the same kind.

Both gunboats were lying close to the bank, *Herald* being highest up, a fine though cloudy day and the current in the Mavusi barely running ½ knot. At 5 p.m. without any previous warning the rain commenced, the river began to flood and in less than an hour had risen six feet and with at least a 6 mile current, carrying trunks of large trees and large masses of reeds with it.

At 6.45 the *Herald* parted her cable and was swept out of the river into the Zambezi where she managed to bring up with her other anchor until steam could be got up.

H.M.S. *Mosquito* was driven into a reed bed with a soft bottom and before the current had abated sufficiently to heave her off, the flood subsided even more rapidly than it had risen and left her high and dry. Next day the ship was lightened and preparations made to dig her out. However, at 5 p.m., and in just the same manner, but with far decreased current and force the river rose again and with the united efforts of 150 natives, both anchors, and steam, she floated off safely having been aground 21 hours.

The natives say that such a thing as two floods on two succeeding days is most rare.

The Zambezi was rising at the time and would have floated *Mosquito* about five days later.

Karuge river.—Above Panzo there are but few villages. At Karuge river is Matakenya village, and between that point and Kebrabasa rapids only a few scattered huts.

The river Karuge was explored for about one mile when the water shoaled suddenly to 2 feet and further progress was stopped.

Pandua Moka.*—The country between Tete and Panda Mokua, where the navigation ends, is well wooded and hilly on both banks of the river. Panda Mokua is a hill 2 miles below the rapids, capped with dolomite containing copper ore.

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* Livingstone.

See chart, No. 1,577.

pp. 209–222.

Rapids.*—Above Panda Mokua are the Kebrabasa or Chinaronga rapids. The lower one of these, named Morambawa rapid, when seen in November (low river), had a fall of 20 feet in a distance of 30 yards, During high river these rapids are said to disappear, and tne river is then half a mile wide, but at low river the rapid rushes through a gorge only from 40 to 60 yards wide. These rapids extend nearly to Chiceva, a distance of about 40 miles; in descending one of these Dr. Kirk nearly lost his life. During high river these are said to be smoothed over.

Navigation above the rapids.—The river is therefore impassable for 40 miles, implying a portage to that extent; above Chiceva the river becomes navigable, and remains so with only one or two rapids that are not of a nature to stop navigation until within 30 or 40 miles of the Victoria falls. This upper reach is more navigable than the portion between Sena and Tete, and can be made use of by vessels of 2 to 2½ feet draught. There are two rapids that would require a little study, but with these two exceptions the river is safe.

Lieutenant Carr, February 1894, remarks as follows:—At Kebrabasa rapids the river suddenly narrows and runs between high rock walls and about 60 yards apart. The current at this time of year (February) being exceedingly strong—so much so that H.M.S. *Mosquito* going full speed could barely make headway. The water literally "boils" over, bursting into large bubbles over a foot high and making it very difficult to distinguish between the rocks and the deep water.

Above the first reach the river narrows again and bends sharply to the south-westward, with rocks scattered about in every direction. Perhaps a very strongly built ship with powerful engines might advance above this point, but the chances of her coming down in safety would be very remote. The bottom and sides are rocky and the least error or accident with helm or engine would mean disaster, especially to a vessel whose bottom is of very thin steel only. If the thing be possible the best time to attempt it would be in May when the river is commencing to fall and the diminished current would give a ship a chance to steer and steam, but a sudden fall in the river—a matter of frequent occurrence—would condemn her to remain above the rapids for a year.

* Livingstone.
See chart, No 1,577.

Victoria falls* are separated by an island into two portions, the whole measuring about one mile in width. The river thus divided drops into a deep chasm from a height of 350 feet, causing a vapour to ascend which has caused it to be named by the natives the Mosi-ao-tanya, or smoke sounding. The streams rush towards one another in the chasm, producing a fearful boiling whirlpool, thence rushes through a zigzag gorge, apparently not more than 20 or 30 yards wide, situated at right angles to the fissure of the falls, beyond which it expands into the upper reach of the Zambezi, but is not navigable for some 30 or 40 miles below, as before mentioned. *See* Distances on river, p. 60. pp. 209-222.

The SHIRÉ.†—General remarks.—The Shiré enters the Zambezi about 110 miles above its mouth, in about lat. 17° 43′ S., long. 35° 24′ E. Its entrance is about 5 miles above Saddle hill 655 feet high, and 2 miles above Shimoara village, and cannot be mistaken on account of the sharp angle it makes with the Zambezi; moreover, in the dry season, it is impossible to proceed beyond the junction, as the flats in the Zambezi re-appear, and if bound to Sena the passage lies through the Ziu Ziu.

The Shiré is navigable for short and handy vessels of about 4 feet draught from about early in March to the end of May; the water is falling from about the middle of April. Vessels of 2 feet draught only can be depended on to pass up the Shiré during the months of September, October and November, and possibly in February (when the river has fallen after the smaller rains), if the greater rains have not commenced. There are flats at the latter time below port Herald lat. 16° 49′ S., and also between that port and Chiromo, with only about 2 feet over them. The ascent to Katungas can only be made when there is an assured rise of 2 feet there, for, should a vessel get caught above the flats with a falling river, she possibly might not get down again before the next rains. The Zambezi and Lower Shiré were in flood from middle of March to middle of May 1891, when the water began to fall. *See* state of the Shiré for 1893-4, p. 42, tide gauge.

The mouth of the river is rocky and somewhat dangerous, but for about nine months of the year the main channel can be avoided,

* Livingstone.

† Information on the Shiré, amended from the remarks of Lieutenants H. J. Keane, H.M.S. *Herald*, Lieutenant A. H. Lyons and Lieutenant G. S. Carr, H.M.S. *Mosquito* 1891-2-3-4.

See chart, No. 1,577.

pp. 209–222. by using a channel about 30 yards wide between an island and the west bank which is almost free from danger. During very low river the main channel must be used, avoiding its east side, and giving also the east point, on which the whale-back trees are, a good berth before turning up for the entrance. A rock in mid-river was dry about 2½ feet at low river, 1890; (the channel is apparently between it and the island before mentioned).

Dangers.*—Two other places in the Shiré also present difficulties to its navigation, namely, the Leak, and Pinda rapid. The former is about 16 miles above Morambala, the Portuguese wooding station and one mile above the Ziu Ziu with which it connects. It is about 80 feet wide here, and at right angles to the Shiré; in the dry season the water runs through it with considerable velocity, and the channel of the Shiré being very narrow, and running close to the Leek there is considerable danger of being sucked down this narrow rapid, and both anchors should be ready.

The Pinda rapid is about half a mile above the Leak; the danger here is caused by a sharp turn, and a swift current caused by the channel being narrowed by a small rocky island. The west channel is the navigable one, keeping near the river bank. The Portuguese telegraph wires lead directly over the island, and seemingly there will be but little space for the funnels of steamers at high river.

The dangers enumerated cause but little anxiety going up, the danger lies in not hitting them off successfully going down stream.

Pinda being passed, there is a clear run through the Morambala marsh to Shuonga; the river is tortuous, but there is plenty of water.

Morambala mountain. — The Shiré is interesting and picturesque as far up as Morambala, above which it becomes wearisome on account of the low banks and monotonous windings of the stream, which almost double the distance; the marshes westward of Morambala, and the Elephant marsh, which begins from abreast the Ruo, are about the worst and most unhealthy parts, and in these no wood for fuel is obtainable. Above Elephant marsh there is plenty of wood.

* H.M. gunboats in the dry season of 1891, found the river blocked below Pinda; they were successful in finding a narrow stream which led into the Ziu Ziu and out near Pinda above the obstruction. The channel was blocked abreast Pinda island in November 1892, and the gunboats which were being taken up in pieces, had to be transported across Pinda island. *See* height of river, pp. 42, 55.

See chart, No. 1,577.

Morambala mountain, meaning the lofty watch tower, is about 4,000 feet in height, 7 miles in length, and situated on the east bank of the Shiré, about 35 miles within its mouth ; it is visible down the Zambezi at Mazaro, and is a striking object. The summit of Morambala, though nearly always enveloped in mist, is far more healthy than the lower Shiré valley. There is a Portuguese wooding station at Morambala station on the bank of the river. pp. 209-222.

At Shuonga or Chiwanga, a notice board was erected in July 1891, in lat. 17° 5½′ S., long. 38° 18½′ E., and all the territory to the northward on the right bank, proclaimed as British Territory. Two conspicuous palms, rising from a small clump form a conspicuous object, one mile north of the notice board. The Ruo river, above, is the boundary on the left bank. There is a flat immediately above Shuonga.

S bends.—At the head of the Morambala marsh are the S bends, so called from the succession of very sharp and narrow bends in the river ; the water is deep, but when the river is in flood the stream is strong, rendering extra care necessary when descending the river.

Above these bends, the river widens and the curves are less sharp ; signs of cultivation which have been absent in the marsh again appear, and the country on the right bank wooded.

Two shallow flats (only 2 feet over them in the dry season of 1890) have to be passed before reaching port Herald.

Port Herald or Juan Makanga, the first British settlement on the right bank, is a fairly large village, and situated in lat. 16° 49′ S. Wood can be supplied by contract here. The run up from Morambala can be made in about 12 hours, so there is no necessity to anchor in the Morambala marsh.

Chiromo.—Above port Herald the river loses much of its previous monotonous character ; numerous islets are dotted about, and trees with heavy creepers overhang the water ; on either hand are ranges of hills, and the lofty summit of Chiperone commands attention. The channel, however, is very shallow ; in September 1891, the river steamers drawing 2 feet 4 inches had some difficulty in descending ; and in October, H.M. gunboats lightened to 2 feet had to be constantly assisted across the flats with warps. The same occurred in November and December 1892, when the new gunboats were being taken up. Everything, however, had reached Chikwawa by 26th January 1893.

See chart, No. 1,577.

pp. 209–222.

Chiromo on the north side of the mouth of the Ruo is a naval depôt and a wooding station of the African Lakes Company. It and the Concession in the Chinde may be considered the headquarters of H.M. gun vessels *Mosquito* and *Herald*.

Ruo river is a tributary of the Shiré, and separates British from Portuguese territory. On the south point of its entrance rest the remains of Bishop Mackenzie, who died here in 1862 from fever caught by severe exposure in the wet season ; the grave is marked by an iron cross, erected by Mr. Young. The Ruo is 100 yards wide and navigable for canoes for about 12 miles, where the rapids begin.

Katungas.—Above Chiromo the river passes through the Elephant marsh and continues shallow ; as before stated, p. 55, vessels of 2 feet draught can only ascend to Katungas on an assured rise of 2 feet at that place, and may have to wait an indefinite period for another rise which may not come until the next wet season. In 1891, the water at Katungas, after the lesser rains fell about an inch daily from 18th February, rendering it necessary for the *Herald* and *Mosquito* to descend to Chiromo, which they did on 11th March.* On 17th March, the Zambezi and Lower Shiré began to rise again. On the 15th June the water was still high in the Elephant marsh, and the current was sluggish, being still banked up by the water in the Zambezi. Elephant marsh, which begins abreast the Ruo, are about the most unhealthy parts, and in these no wood for fuel is obtainable. Above Elephant marsh there is plenty of wood.

Chikwaka, 1½ miles above Katungas is the Administration station whence there is a road to Blantyre, &c.

Mulilima (Chibisas)† village, a few miles above Katungas, on the opposite bank, is situated about 10 miles below the Murchison rapids ; the *Pioneer* spent a season here, whilst Livingstone was visiting the Nyasa and Shirwa lakes. At a sharp bend above Chibisas, the channel is barred by rocks during low river ; Matiti

* The river was in the same state during November and December 1892, and to the middle of January 1893. *See also* p. 42.

† The *Pioneer*, drawing 5½ feet, with Dr. Livingstone, has been up to Chibisas village, about 10 miles below the Murchison falls, but in November, when she wanted to come down, the water did not rise enough to permit her to pass the flats situated just above the Elephant marsh, above the mouth of the Ruo, and she had to wait until the great rise began, which, in that year, was 19th January, on which day the river rose about 2 feet. The *Itala*, drawing 4 feet, had also to lighten to pass the same flats, and also at other places (in the dry season of 1875).

* *See* chart, No. 1,577.

village is at the foot of the rapids, on the western bank; Ramakukans village is nearly abreast of it. pp. 209-222.

Murchison rapids or falls begin in lat. 15° 55′ S.; there are four principal and five minor cataracts, extending over a distance of 40 miles of the river in a north and south direction, to near Matope lat. 15° 25′ S., whence the river, though shallow, is navigable to lake Nyasa. The lower cataract, named Mamvira, falls 800 feet in about 100 yards, and the level of the land below it is about 1,200 feet below that and the upper cataract, and which is nearly 1,500 feet above sea level.

Above the rapids the Shiré is again navigable for shallow draught vessels from Matope (24 miles in a straight line from Blantyre, and about 60 miles by the road *viâ* Blantyre from Katungas) to lake Nyasa, a distance of about 70 miles.

Owing to the steady fall for some years of the level of the lake, this upper part of the Shiré carries less water than it formerly had, and, in two places in particular, it is in the dry season scarcely passable for any vessel over 2 feet draught. These places are a few miles above Matope, and in lake Pamalomba a broad and shallow expansion of the river 10 miles from the Nyasa itself.

Mpimbi, 6 miles above Matope, is, however, now more used as the commencement of navigation, as it is more healthy and some of the difficulties of navigation between those places are avoided.

Fort Johnston (14° 25′ 46″ S.).—On the river about 2 miles from lake Nyasa, on its left or east bank, stands fort Johnston, a station of the British Commissioner, and at present the head-quarters of the administration on the lake. On the opposite side are several villages, of which Mpondo is the chief. It is said to be healthy.

Bar.—The bar between fort Johnston and lake Nyasa had a depth of 3 feet 2 inches only in August, 1894, which would prevent the gunboats on the lake visiting the fort again until the rainy season. The lake in 1894 was unusually low.

African Lake Company's stations.—The African Lakes Company have trading stations at the concession in the Chinde; at Chiromo near the mouth of the Ruo; at Katungas, the head village of a Makololo chief of that name, from whence there is a road, *viâ* Blantyre, to Matope and Mpimbi above the Murchison falls.

See chart, No. 1,577.

pp. 209–222.

Shiré highlands.—Blantyre.—In the Shiré highlands is Blantyre, the head mission station of the Established Church of Scotland; it is situated in lat. 15° 47′ S., long. about 35° 4′ E., 3,000 feet above the sea, and 28 miles by road from Katungas on the Shiré.

In the highlands around Blantyre are several sub-mission stations, at Zomba, and elsewhere; the African Lakes Company have established a station at Mandala, close westward of Blantyre, for the development of commerce and agriculture. Buchanan Brothers and others are growing coffee for exportation and local consumption. The highlands over Blantyre attain a height of 5,000 feet above the sea, and the climate on the whole is healthier and more suitable for Europeans; some parts are considerably higher. The average temperature is 50°, the minimum about 40°, but it has been known to fall to 30°. Fruit and vegetables are grown in profusion, and the highlands are used as a sanatorium by those at the Mission stations in Nyasa, who require a change. Morambala mountain is also suitable for a sanatorium.

Zomba.—The British Commissioner resides at Zomba, 39 miles northward from Blantyre by road and two days from Chiromo by native runners.

Zomba is connected with the Lower Shiré, *viâ* Blantyre, by an excellent road suited for wheeled traffic of all descriptions, besides being connected by good roads with Mlanje and Chiromo, and also with Domasi on the Upper Shiré.

Mails and Telegraph.—Fortnightly (*see* p. 36).

The distances from the sea are very approximately as follows; the windings of the stream and the toiling against the current make the distances appear much greater than they really are :—

Mazaro	80 miles.
Mopea	85 „
Shupanga	90 „
Junction of the Shiré	110 „
Katungas village (Blantyre 18 miles and Zomba 67 miles beyond, by the road) ...	290 „
Murchison rapids on the Shiré	300 „
Sena on the Zambezi	140 „
Lupata gorge	340 „

See chart, No. 1,577.

Tete	300 miles.	pp. 209-222.
Kebrabasa rapids	320 „	
Zumbo, mouth of Loangwa	550 „	
Victoria falls	1,000 „	

LAKE NYASA.*—Nyanya ya Nyanyesi, or Lake of the Stars, is about 300 miles in length, north and south, from 12 to 40 miles in breadth, and about 1,500 feet above sea level. Its surplus water is carried off by the Shiré to the Zambezi and thence to the sea. Several mission and trading stations are established on its shores.

Winds.—Climate.—From March to October, the south-west monsoon period, a strong southerly wind blows up the lake, rising at times to half a gale, causing a nasty sea and rendering navigation unpleasant in the small lake steamers. From October to March, the north-east monsoon period, light northerly winds and calms are the rule; occasionally a strong easterly wind will blow for some days from about 3 a.m. to noon, when it dies away.

As regards healthy and unhealthy seasons for work, H.M. Commissioner H. H. Johnston, remarks :—May is the unhealthiest month in Nyasaland, and June is not very good. The worst of the rains is over in March, and April is an agreeable month, cool, but not too chilly, bright sunshine with occasional showers and without high winds. The unhealthiness of the middle and end of May is caused by the strong cold winds from the southward and the drying up of the marshes. The main cause of ill-health in tropical Africa is catching cold. The cold winds of May produce fever by the sudden lowering of the temperature. The rainy season is not an unhealthy season except for people who are travelling through a country without shelter, and constantly soaked through with rain and unable to find a dry habitation.

Sketch plans of Chisimulu, M'bampa cove, Kaango, Chisanga, Pachía, Sumba, Chikole, M'luluka, Losewa, Chilowelo, Lusumbwe or Monkey bay, and Old Livingstonia are given on chart No. 1,578.

Monkey bay is the safest of these anchorages. In most of them the bank shelves steeply, and vessels often drag their anchors with off-shore winds.

Missions.—There are at present seven missionary societies at work in the eastern half of British Central Africa.

The Universities Mission, which is Anglican, occupies the eastern

* *See* Admiralty chart of lake Nyasa, northern portion, No. 1,578, with plans.

pp. 209-222. shore of lake Nyasa, with its head quarters at Likoma island. It has also stations on Chisamulu (Tshisumula) island, and at various points on the shore and in Yao country, and one at the south end of the lake. It possesses the *Charles Janson* steamer.

To the Church of Scotland Mission is practically due the founding of the important town of Blantyre. This Mission has also stations on the east side of mount Zomba, and on the north-west flank of mount Mlanje, and several small stations. This Mission has a river steamer which plies between Chinde and Katungas.

The Livingstonia Free Church Mission founded in 1875, has its main establishment at Bandawe on the west side of lake Nyasa. They have stations in southern and northern Angoniland (within Bandawe) and in the Konde country, north end of the lake.

The Zambezia Industrial Mission is settled near Blantyre and in southern Angoniland; they propose principally to instruct the natives in agriculture, &c.

The sphere of the London Missionary Society lies on lake Tanganika and the plateau south of it. They have the *Good News* steamer on Tanganika and a large sailing boat named the *Dawn*.

The remaining Missions in British Central Africa are the French Algerian and the Dutch Reformed Church.

Steamers on the Zambezi and lake Nyasa.—The following is from the latest information at hand :—

British.—H.M. gunboats *Mosquito* and *Herald* on Zambezi and Lower Shiré—stern wheelers, with a load draught of 2 feet 6 inches; can lighten to 2 feet.

Screw gunboats *Adventure* and *Pioneer* on lake Nyasa. Small paddle wheel steamer *Dove* for Upper Shiré.

The African Lakes Company has five or more steamers on the Zambezi—viz., *James Stevenson*, a stern wheeler, 90 feet in length with a draught of 3 feet. *Lady Nyasa*, a paddle; *Scotia*, a screw steamer; the *Phail*, a screw steamer, and a steam launch.

And on lake Nyasa, the *Domira*, 80 feet in length, 4½ feet draught; and the *Ilala*, 50 feet in length and 4 feet draught.

The Sharrer's Zambezi Traffic Company have for the Zambezi and Shiré, the *John Bowie*, paddle steamer, 65 feet long; a similar steamer name unknown; the *Annie Louise*, and a small screw launch.

See charts, Nos. 1,577, 1,578.

British—*continued.*

The African International Flotilla Company have the *Argonaut*, a stern wheeler, and two screw steam launches. pp. 209-222.

Mission steamers:—On the Zambezi, the *Henry Anderson*, paddle; and on the lake Nyasa, the *Charles Janson*.

German.—On the Zambezi is the *Bismarck*, belonging to Deuss, Verten & Co. On Nyasa is the steamer *Hermann von Wissman*.

Portuguese.—There are three or more Portuguese gunboats on the Zambezi.

Mails and Telegraph.—*See* p. 36.

COAST.—From the Chinde mouth of the Zambezi the coast trends north-eastward about 40 miles to Kilimán river, in which space there are several streams, some of which connect with the Zambezi. This coast is very low, being scarcely ever seen from the deck in 10 fathoms water; it is a little higher about 8 or 10 miles south-west of Linde river, and again at Linde river, at which place it shows in clumps of trees. A little to the southward of this river there are some sand cliffs separated from the beach by a long lagoon; these cliffs are conspicuous with the morning sun shining on them. The current along this coast is generally S.W. one knot an hour.

Close north-eastward of the Chinde, and separated from it by Mitaone island, is the mouth of the Inhamhona, and other mouths, which possibly connect with the Zambezi, but we have no information on them.

The general soundings along this part of the coast are 4 fathoms at low water at 3 miles from the shore, and from 6 to 9 fathoms at 5 or 6 miles from the shore, except off the entrance of the rivers. As the soundings are but few it is not advisable to hug the shore when bound up or down the coast.

Linde (Indian) river.—The mouth of this river lies about 30 miles south-west from that of Kilimán about 18° 13′ S. We have no information on the bar other than shown on the chart, which gives a depth of one fathom on it at nearly 4 miles off shore. There is a large estuary within the bar, with several islands. It possibly connects with the Zambezi.*

* *See* Admiralty chart:—River Zambezi to Mozambique harbour, No. 1,810; scale, $m = 0{\cdot}1$ of an inch.

pp. 209-222. The main branch was explored for 30 miles, with variable depths to that distance. The brig *Singapore*, in 1822, ascended the river about 16 miles, and the least water obtained was 2 fathoms. The Olinda, a stream on the north side of the estuary apparently was examined by the boats of H.M.S. *Grecian* for a distance of 12 miles; the depths ranged from 10 to 5 fathoms.

Linde river may possibly be known by a remarkable clump of trees about 1¼ miles to the northward of it, which, when bearing to the westward of North, formerly assumed the form of a camel. For a short distance on each side of the entrance of the river there are no tall trees. The entrance of the river shows well on a N.W. by W. bearing.

The coast between Linde river and Kilimán is covered with vegetation, and there are several low sand hills and reddish looking patches; at about 2½ miles north-east of Linde river there is a low but remarkable bluff. The soundings decrease regularly towards the shore, but this neighbourhood has not been closely examined.

KILIMAN (Quilimane) RIVER lies between Tangalane and Olinda (Hippopotamus) points, one mile apart; there is a depth of 21 feet on the bar at high water spring tides, which depth, and more, may be carried to the town. The land on both sides of the entrance is low, sandy, and covered with trees or jungle, the south-west side being rather the higher. The light structure, painted black, and the flagstaff and beacon on Tangalane point, are visible some time before the land, which may be safely skirted at a distance of 5 or 6 miles, the outline of the coast being then clearly distinguishable, but as the current is strong and uncertain in the neighbourhood, caution is necessary. The entrance of the river is conspicuous when open on a N.N.W. bearing, the river being wide and nearly straight for 10 or 12 miles; when abreast of it no land will be visible from the deck between the points of entrance; but from aloft, Pequena island, which is about 4 miles inside the entrance, will be seen.*

LIGHT.—From a truncated pyramid on Tangalane point, is exhibited a *fixed white* light, visible in clear weather from a distance of 8 miles. It is contemplated to erect leading lights for the bar here. The stands have been erected.

* *See* Admiralty plan :—Kilimán river, with view, No. 650; scale, $m = 1{\cdot}6$ inch; it does not, however, now correctly represent the entrance.

Signals.—The lightkeeper has the international code of signals, but his interpretation of the signals cannot be depended on. If a message is required to be sent, it is better to land and see him, when it will be forwarded by telegraph to the town. pp. 209–222.

Outer anchorage.—A good temporary position is in 5 fathoms, with the lighthouse bearing N. ½ E., distant 5 miles. For a stay, however, it would be better to anchor south-eastward of Tangalane back, as there is said to be less sea and tidal stream and current than directly off the bar.

Pilot and steam tug.—A pilot is obtainable for the river between the lighthouse and the town, but not for the bar. A small steamer is sometimes available for towing sailing vessels.

Pilotage dues are compulsory, men-of-war excepted.

The RIVER is entered between Tangalane point and Olinda point; from thence there are three channels to the town, named respectively Olinda, Militáo, and East channel; the Militáo is buoyed.

The bar is about 4 miles seaward of Tangalane point light; it varies in different seasons, and especially after south-west gales. At high water it is generally smooth.

The bar has about 21 feet at high water springs. At about one mile within it, between Cavallos Marinhos and the spit extending westward from Tangalane bank, the channel is about half a mile wide, widening and deepening within. Abreast Tangalane point it is reduced to about 4 cables. Tangalane bank, a portion of which dries at low water, has extended south-westward, but its limit is not definitely known.

A patch of 7 feet, however, is situated with the flagstaff bearing N. 15° E., distant $2\frac{8}{10}$ miles; the channel is westward of it.

The channel formerly known as the boat channel, close along Olinda point, is closed, but it is possible that it may again become available for boats.

Buoys.—Beacons.—A fairway and seven or eight other buoys mark the entrance to Kilimán river, and Militáo channel, placed as follows, and numbered consecutively from seaward. Nos. 2, 3, 7,

See plan, No. 650.

pp. 209–222. 8, and 9 are starboard hand buoys when entering the river ; Nos. 4, 5, and 6 are port hand buoys.

No. 1, a fairway buoy, spherical, with staff and globe, painted black and white in horizontal stripes, lies in 19 feet, outside the bar, with Tangalane light N. by E., distant $4\frac{4}{10}$ miles.

No. 2 buoy, a red spherical ball, surmounted by a staff with double cone, marks the western edge of Tangalane bank spit in 21 feet water.

No. 3 buoy, red, lies about midway between No. 2 buoy and Tangalane point light, and about $1\frac{1}{2}$ cables eastward of a line joining them.

Nos. 4, 5, and 6, black, mark the east and western sides of Militáo bank. Nos. 7, 8, and 9, the south, south-west, and west sides of Pequena bank. The existence of No. 8 is doubtful.

Two triangular beacons have been erected northward of Tangalane point. The rear beacon, 30 feet in height, is situated with Tangalane light bearing South, distant one mile ; the front beacon, 23 feet in height, is situated N. 76° W., distant 262 feet from the rear beacon. These beacons, in line bearing S. 76° E., leads through Militáo channel. (July, 1894.)

Caution.—The buoyage, independent of changes in the channel, is not at all reliable. The rush of the tide is apt to shift them, and they are left so long unattended to that they are often quite misleading, and the distinctive colours quite washed off.

Tides.—It is high water, full and change, at about 4h. 20m. ; springs rise $12\frac{1}{4}$ feet, neaps $7\frac{1}{2}$ feet ; the tides are said to be irregular and to extend 50 miles up the river.

The streams run about 3 knots an hour in the river ; after crossing the bar and nearing Tangalane light, the flood sets directly on to the banks off Olinda point, rendering great care necessary.

Current.—Outside, the current generally sets from one to 2 miles an hour to the south-westward, causing vessels at anchor off the bar to lie broadside to the swell and roll considerably.

Directions.—It is not advisable for a vessel drawing over 10 feet to cross the bar without the assistance of a pilot, or a boat ahead sounding. (The mail steamer, Union line, does not enter the river.)

See plan, No. 650.

Entering Kilimán river—from the fairway buoy, Tangalane point light should bear about N. by E., and the bell buoy should be well open of Tangalane point. Steer to pass about 2 cables westward of 7 feet patch and of the bell buoy; thence westward of No. 3 red buoy, and eastward of Nos. 4 and 5 black buoys. With a strong flood, No. 5 should be rounded pretty close to avoid being swept to the northward. Thence with the beacons in line astern, bearing S. 76° E., proceed northward of No. 6 black buoy, and southward and westward of the remaining red buoys. Thence to the anchorage off the town, the deepest water on the way up will be found at the distance of about one cable from the western bank of the river. In Militáo channel the streams set across both ends, and should be guarded against. It sets fair, however, through its middle portion. pp. 209-222.

Caution.—It must not be assumed that these directions, 1893, will remain available for any length of time, as the banks are constantly changing. The breakers are said to be a better guide than the chart, but much precaution is necessary, especially in boats crossing, as the breakers are so treacherous, that a solitary wave at times comes in and breaks heavily when the water on the bar appeared smooth immediately before. Many lives have been lost, amongst others a native pilot of experience and all his crew perished.

Anchorage.—There is very good anchorage about one mile north-westward of the lighthouse, northward of the creek, in about 5 fathoms; the tide runs about 3 knots an hour.

Pequena island, situated in mid-river, is low and covered with dense jungle; extensive banks extend both north and south of this island, leaving a channel to the town close along both shores. The bank has extended southward into Militáo channel since the survey of 1885, as now charted.

Militáo bank separates Olinda and Militáo channels; it dries for a distance of 2 miles in a north-west and south-east direction, and about one mile north and south, and is subject to change. Mangroves are growing on the high part of its north-west side, affording a guide to the best water, which is about 2 cables northward of them.

Militáo channel, with an average width of half a mile, is between Militáo bank and the bank extending southward from

See plan, No. 650.

pp. 209–222. Pequena island ; it is straighter, has more water, is buoyed, and is easier of navigation than Olinda channel.

Buoyage and directions are given on pp. 65, 66.

East channel runs close along the eastern bank of the river, and has a depth of about 20 feet at high water ; from abreast the light-house the river bank should be followed, at about one cable distant, until abreast the north-west end of Pequena island, where a shoal extends 1½ cables from a rounded point ; after passing this shoal the shore may again be followed to the town.

Olinda channel is southward of Militáo bank, and was the channel most frequented previous to the survey in 1885. It is obstructed by shoals, is unbuoyed, a strong current sets across it, and no directions can be given that would be of use to a stranger.

KILIMÁN is situated on the eastern or left bank of the river, at 10 miles above Tangalane point at the entrance. It ranks next in importance to Mozambique, and was, until the opening up of the Chinde route, the head-quarters of the Zambezi trade. The church and barracks are conspicuous buildings, and the town is surrounded by cocoa-nut trees. There is a landing jetty available at all times, close to the custom-house and government offices.

Moorings are laid for two government steam vessels off the landing place, and the mud bottom is very soft.

Trade.—The district of Zambezia, of which Kiliman is the chief and only place worth calling a town, extends along the coast from the Zambezi mouths to Angoche. The whole district is traversed by navigable rivers connected by natural canals, and afford easy means of transit.

The exports consist of oil seeds, such as ground-nuts, sesame seed and copra, india rubber, beeswax, ivory, gold dust, sugar, and locally native tobacco.

Imports consist of blue and white cotton, printed goods, beads, brass wire, implements, provisions, wines, besides many other articles.

Some portion of the Zambezi trade passes through Kilimán, as already mentioned ; it is conveyed in canoes or lighters up the Kilimán or Kwa Kwa river to Marendene, or Mopea just beyond it,

See plan, No. 650.

depending on the amount of water in the river, a distance of about 80 miles, whence it is carried across to the banks of the Zambezi and re-shipped. Steamers of 6 feet draught go up as far as the junction of the Mutu with the Kilimán. The remainder of the trade is *viâ* the Chinde. pp. 209–222.

The value of the exports in 1893 amounted to £81,841, and the imports to £114,612.

The population consists of a Portuguese military commandant and other government officials, a few Europeans, some half-caste soldiers, and about two thousand blacks. The population of the province is estimated at four millions. The British Indians number from 300 to 400, most of whom are in the Chinde.

Supplies.—Fresh provisions, beef, poultry, vegetables, and fruit can be obtained in small quantities; the water, obtained from wells in the sand, is scarce and bad. Except beef, provisions may be obtained cheaper by anchoring on the west shore 6 or 7 miles below the town, where the natives bring supplies down. The only coal mines in the district, p. 52, near Tete, are in the hands of the Companhia da Zambezi; it is said to be of fair quality for steaming purposes, but much, probably, depends on the character of the furnace.

Slight repairs to vessels, such as carpenters', blacksmiths', and caulkers' work, can be effected at reasonable rates.

There is a General Hospital, and one for infectious diseases outside the town, attended by a Government doctor and a staff of European and native assistants.

Telegraph.—Kilimán is connected with the principal places in the Zambezi by telegraph, *see* p. 36.

Mails.—The Union Line of steamers, monthly to Zanzibar, call off the bar, both going and returning. The German East Africa Company call monthly. *See also* p. 36 and p. 6.

Winds.—The prevailing wind off Kilimán is from S.E. to South during the greater part of the year. From January to March probably it is westward of South. Whilst lying off Kilimán in October, the winds varied from S.S.E. to E.S.E., and blew throughout the night, only lulling in the morning; but this is unusual, a land wind generally setting off at night. Off the town, in July, the

See plan, No. 650.

pp. 209–222. sea breeze from about S.S.E. was observed to set in at noon with a force of 1 to 3; during the night it was usually calm, with the land breeze in the morning.

Climate.—The climate is unhealthy, and said to be unfit for Europeans. Temperature in the early morning (July) has been noted as low as 62°. The heaviest rains occur in January and February, accompanied by much lightning. There are light rains in November, and also in May and June.

223. **Macuse river.**—The following directions applied to the bar in 1893, and cancels lines 4 to 11.

The bar is about 4 miles off shore, and connects the banks which break heavily at times, to about the same distance off both points of the entrance.

The bar has a depth of 7 feet at low water, and 21 at high water springs on the leading mark—namely—the three conspicuous palm trees (situated on its north bank 5 miles N.N.W. of the eastern point of entrance) in line with Regis point bearing N. $\frac{1}{4}$ W. This mark should be steered for until the east point of entrance bears N.N.E. $\frac{3}{4}$ E.; thence a course to pass half a mile westward of that point; from abreast it, incline towards the eastern shore to abreast the village between the three palms and Regis point, which point is situated at the mouth of a creek on the eastern shore almost midway between the entrance point and the palms.

There is anchorage off the village in about two fathoms. There is apparently not less than 10 feet at low water as far as Muxixine, a small fort, about $3\frac{1}{2}$ miles up, by following the bends of the river. Villa Candida is situated one mile up a creek just eastward of Muxixine. Maquival, another small fort, is about 16 miles above the entrance, and the village of Chico about 9 miles up.

p. 224. Last line—after Macalonga point—add, and the Blanche river, 15 miles westward of the point. (Omit foot note).

p. 226. Line 8 from bottom, for E.S.E. *read* E. by S. $\frac{1}{2}$ S., and add—shallow water, with less than 3 fathom, extends about $4\frac{1}{2}$ miles S.S.E. of Macalonga point.

p. 227. Line 6, add—There is good anchorage close off the west side of Epidendron island in 12 fathoms.—(*Blanche*, 1892).

See chart, No. 1,810.

Angoche.—Settlements.—Line 6 from bottom, omit last two words, and *read*, Parapat. p. 230.

The name has since been changed to Antonio-Ennes. On account of the unhealthiness of Angoche Antonio-Ennes is now the chief town, and the residence of the military commandant. The post of Governor has been abolished. pp. 230, 231.

Trade.—The exports in 1893 were valued at £16,666, and the imports £685. Three European firms are represented here. Sangage and Mome are two trading centres on the coast in this district, positions not charted.

Line 3 from bottom, add—Good anchorage was found by H.M.S. *Blanche* in 1892, within Antonio bank. p. 231.

CHAPTER VII.

MOZAMBIQUE HARBOUR—Landmarks.—A new church has been constructed 200 yards S. 27° E. (true) from the green lights on the end of the pier, Mozambique island. Its white spire about 140 feet in height is a conspicuous object from seaward.* p. 236.

A bank of considerable extent, with depths of 3 to 5 fathoms, exists about half a mile westward of Leven bank, where 6 to 7 fathoms were shown on the plan (662). There is probably less water. p. 238.

Fort Lorenzo is no longer a fort, but is used as a powder magazine. p. 239.

Mails.—*See* p. 6.

Piers.—The landing pier has been repaired, but not extended into deep water.

The construction of a deep water wharf was commenced, and 120 feet of it accomplished, but work has been suspended. An addition of 300 feet is necessary to render it of more utility than the present landing pier.

Water.—A water tank to hold about 6,000 tons, was built in 1893. Water was being collected, and it is now probably available for the shipping.

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* H.M.S. *Stork*, 1889.

See plans, Nos. 652, 653.

p. 239. **Trade.**—109 vessels entered the port in 1893 of the aggregate tonnage of 105,884 tons. 103 were steam vessels.

About 40 British Indian dhows are engaged in the coast trade, aggregating about 2,000 tons. 164 clearances were obtained at the Consulate. These dhows sail to Bombay and Kutch in September and return in February or March, the voyage occupying about 25 days.

The value of its exports in 1893 was £72,000, and the imports £134,000.

p. 240. Line 12. For white square tower, *read* building resembling a church, with square yellow tower.—Line 23. For a turret near a white house, *read* from an iron support on a stone base, in front of a yellow house with a turret on its western end

Leading light and beacon.—Harpshell spit beacon is situated 300 yards N.N.E. $\frac{3}{4}$ E. of the position given in bottom line, p. 240; it is not easily distinguished. Cabeceira light is situated N. 13° W. distant $1\frac{8}{10}$ miles from it, and must be amended accordingly.

p. 241. Directions.—A broad white stripe has been painted on fort St. Sebastian, to make it more conspicuous as a leading mark*. Line 22—For white *read* yellow with turret.

pp. 251, 252. **Pomba bay.**—Soundings of 7 to 8 fathoms were obtained by H.M.S. *Raleigh*, 1890, from one to $1\frac{1}{2}$ miles northward of Maunhane point, where no soundings have been hitherto charted. As shoaler water may possibly exist, caution is necessary when navigating in that locality.†

p. 257. **Ibo.—Trade.**—The value of the exports in 1893 was about £60,828, and the imports 66,600.

CHAPTER VIII.

p. 282. **Mnazi bay.**‡—Lines 6 and 9 from bottom. The conspicuous tree no longer exists; it has been blown down. Also p. 283, line 18.

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* The ladder of the inner *green* light in line with the flag staff, bearing N.W. by W. $\frac{3}{4}$ W., is said to be a good mark for entering on.

† *See* plan of Pomba bay on chart, No. 1,809.

‡ *See* plan, on No. 690.

MIKANDANI HARBOUR.—Buoyage*.—The buoyage of Mikandani harbour in 1893, the latest information, is as follows :— pp. 285-6.

A red spar buoy, with white topmark A, and marked $\frac{A}{MJK}$ in white letters, is placed in 5 fathoms on the western side of the entrance, with Pemba point bearing S.W. $\frac{1}{4}$ W., distant $1\frac{1}{6}$ miles.

A similar buoy, with white topmark B, and marked $\frac{B}{MJK}$ is placed in $4\frac{1}{2}$ fathoms, with Pemba point S.W. by W., distant 7 cables.

Abreast A, distant one cable, a black conical buoy, marked $\frac{I}{MJK}$ in white letters, in $5\frac{1}{2}$ fathoms, marks the east side of the entrance. Within B, with Pemba point bearing S.W. by W. $\frac{1}{2}$ W., distant 5 cables, is a similar buoy in $4\frac{1}{2}$ fathoms, marked $\frac{2}{MJK}$, also on east side of the channel.

A white beacon, surmounted by two triangles (points upwards) marks the rocks on the south side of the harbour, with the Custom house bearing S.S.W. distant 3 cables.

Directions.—Line 13 *after* southerly—add, passing between the black buoys on the port hand and the red spar buoy on the starboard hand, but too much dependence must not be placed on these buoys maintaining their assigned positions. p. 286.

Directions.—A new custom house, white, and twice as high as the old one has been built at the west extreme of the beach. Omit lines 6 to 15 and insert.—Proceeding for the river, do not close the coast within $2\frac{1}{2}$ miles until the new custom house at Sudi is well open This custom house in line with a gap in the distant hills, (see view on sheet 681) bearing S.W. by S., leads westward of Nymphe shoal and nearly up to the entrance to the river. When Madjovi high rock bears S.W. $\frac{1}{2}$ W., edge to the eastward until the old custom house is about its own width open of the sand spit extending from Ras Swa Swa, which will lead in mid-channel to the anchorage off Mwania. p. 288.

Lindi river.—Buoyage.†—Two buoys (1893) have been placed to mark the starboard side of the channel when entering, but they are not to be depended on. A red spar buoy with white topmark p. 290

* *See* plan, No. 684. † *See* plan, No. 681.

p. 290. and marked $\frac{A}{Lindi,}$ is placed in $3\frac{1}{2}$ fathoms with Ras Rungi bearing South, distant $1\frac{1}{2}$ cables.

A similar buoy, marked $\frac{B}{Lindi,}$ is moored in $3\frac{3}{4}$ fathoms, with Ras Rungi bearing East, about 7 cables.

Line 10, after *bold to*—add, *see* buoyage.*

Foot note p. 290.—H.M.S. *Boudicea* in January 1890, found a depth of $4\frac{3}{4}$ fathoms on the bar at one hour before high water and experienced no difficulty in entering. Her draught was nearly 24 feet. The harbour is scarcely adapted to such heavy draughts.

Mails. *See* p. 6.

p. 303. Line 12 from bottom and p. 305 line 17.—Gingwera tree is no longer to be distinguished from those around it.

p. 303. **Anchorage.—Buoy.**—A red barrel buoy, marked with an anchor, and surmounted by a white flag, lies off Kilwa Kivinje, in about $3\frac{1}{2}$ fathoms water, with the station building bearing S.S.W., and distant $1\frac{1}{4}$ miles from the shore.

p. 304. **Fanjove island.** *See* light, p. 152.

p. 307. **Mafia channel.—Buoyage.**†—The following buoys have been placed to mark certain dangers in Mafia channel and its approach inshore from Kilwa.

p. 307. **Poiasi reef.**—A black conical buoy marked $\frac{6}{Mafia}$ in white letters is moored on the western edge of Poiasi reef, with Pumbavu island bearing E. by S. $\frac{1}{2}$ S. distant $5\frac{2}{10}$ miles, and Nunguruku hill S. by W. $\frac{3}{4}$ W.

p. 308. **Machangi reef.**—A black conical buoy marked $\frac{5}{Mafia}$ in white letters, is moored near the north-west end of Machangi reef, with Nyuni island bearing E. $\frac{1}{4}$ N. distant $8\frac{4}{10}$ miles, and Simaya island N. by E.

Choca reef.—A red *spar* buoy marked $\frac{D}{Mafia}$ in white letters, and a topmark D, is moored on the eastern edge of Chocha reef, with Nyuni island bearing E. $\frac{3}{8}$ N. distant $9\frac{1}{2}$ miles, and Simaya island N. by E. $\frac{3}{4}$ E.

* *See* plan of Mgau Mwania, and Lundi river, No. 681. Insert the word *old* before custom house in foot note, p. 288.

† *See* Admiralty charts, Nos. 1,032, 662, and 458. These buoys are not to be depended on.

Line 9 from bottom—add— p. 314.

The Rufiji was ascended by the Simba Uranga mouth, by Lieutenant Fromm, a German officer, in a steam pinnace drawing 5½ feet, and a whale boat, in May 1892. Entering the river on May 9th, he reached Korogero on May 25th, formerly a large village, but was destroyed by the Mafite, a few huts only remaining. This place is within two days' journey of Kisake, a German station (on the Kingani river).

The Pangani falls were visited on foot from Korogero ; the river was about 30 yards wide and the falls about 3 feet in height (about 5th June) the river had fallen about that amount in the previous fortnight.

The river is said to be navigable to the falls, at all seasons, for vessels of 2½ feet draught provided the channel is marked ; but as the channel is constantly shifting that is impossible. One bar at least (at Kilindi) which just admitted of the passage of the pinnace going up was dry on the return some 3 weeks later, and the descent was made by a detour, joining the main branch lower down. In places the depths are from 20 to 26 feet. The river fell 4½ feet between 9th May and 23rd May, the last mentioned being the date the mouth of the river was again reached. The rise of the river is about 15 feet, and it is lowest in November, as in the Zambezi—the characteristics of the two rivers being much the same. The tide ceases at Jobine-Jongo. Many villages were met with and in places the houses were built on piles, the localities being flooded at high river. Bananas, mangoes, and rice were plentiful near the villages. Wood for fuel (ebony) is abundant between Nyanda village and the Pangani falls, except for a short distance when there was no wood.

Mafia channel.—Buoyage *continued.*—**Ras Kisimani.**—A p. 317.
black conical buoy, with $\frac{4}{\text{Mafia}}$ on it in white letters, placed in a depth of about 11 fathoms, lies at the western edge of the shoal ground southward of Ras Kisimani with Ras Kisimani bearing N. ½ E., distant $2\frac{4}{10}$ miles.

Fungu Marima.—A red spar buoy, with $\frac{C}{\text{Mafia}}$ on it in white letters, and surmounted by a white C, in a depth of about 6 fathoms, lies at the south-east extreme of Fungu Marima, with Ras Kisimani bearing N.N.E. ¾ E., distant 8½ miles.

See charts, No. 1,032 and 662.

p. 318. **Al Hadjiri.**—A black conical buoy, with $\frac{3}{\text{Mafia}}$ on it in white letters, in a depth of about 7½ fathoms, lies on the west side of Al Hadjiri, with White house on Mafia bearing E. by S., distant $6\frac{7}{10}$ miles.

p. 319. **Salim bank.**—A black conical buoy, with $\frac{2}{\text{Mafia}}$ on it in white letters, in a depth of about 5 fathoms lies at the north-west extreme of Salim bank, with White house on Mafia bearing S.E. ¾ E., distance $5\frac{9}{10}$ miles.

p. 320. **Ras Mkumbi.** *See* light, p. 152.

p. 322. **Wumi reef.**—A red spar buoy, with $\frac{B}{\text{Mafia}}$ on it in white letters, and surmounted by a white B, lies in a depth of about 8 fathoms on the eastern side of Wumi, with Shungu mbili east extreme bearing E. by N. ½ N., distant 5½ miles.

Fili reef.—A red spar buoy, with $\frac{A}{\text{Mafia}}$ on it in white letters, and surmounted by a white A, lies in a depth of about 11 fathoms on the eastern side of Fili, with Niororo tree bearing N.E. by E., distant $4\frac{2}{10}$ miles.

Niororo island reef.—A black conical buoy, with $\frac{I}{\text{Mafia}}$ on it in white letters, lies in a depth of 12 fathoms, off the north-west extreme of the reefs surrounding Niororo island, with Niororo island north point bearing S.S.E., distant $1\frac{4}{10}$ miles.

p. 327. **Ras Kanzi.**—*See* intended light, p. 152.

CHAPTER IX.

pp. 335–339. **DAR-ES-SALAAM. — Beacons. — Buoyage.***—From latest reports the buoys are situated as follows :—

p. 336. A white spar buoy, with two black triangles, points downwards, in 8 fathoms, marks the north extreme of Makatumbe reef, with Hammond rock S.S.E. ¾ E. about 4 cables.

p. 339. A white spar buoy, with two black triangles, points upwards, in 5½ fathoms, marks the south-east extreme of Daphne reefs.

Outer Makatumbe.—*See* light, p. 152.

* *See* Admiralty plan of Dar-es-Salaam, No. 674.

Red buoys mark the starboard side of the channel to the harbour, and black buoys the port side, as follows :— p. 339.

A red spar buoy with white top mark A and the inscription $\frac{A}{Dr.s.m.}$ in white letters, lies in $5\frac{1}{2}$ fathoms, just westward of the line of the beacons on Ras Rongoni, with the obelisk distant $8\frac{1}{2}$ cables. A black conical buoy, in $6\frac{1}{2}$ fathoms, with the inscription $\frac{I}{Dr.s.m.}$ in white letters, lies just eastward of the line of the beacons on Ras Rongoni, with the obelisk distant $3\frac{3}{4}$ cables. The south-east extreme of North Sandhead spit is guarded by a red spar buoy with white top mark B, and the inscription $\frac{B}{Dr.s.m.}$ in white letters. A red spar buoy, with top mark C, and the inscription $\frac{C}{Dr.s.m.}$, lies in 5 fathoms with West Ferry point S.W. by W. about 3 cables.

Three black conical buoys mark the northern edge of the shoal off Ras Makabe. They are numbered 2, 3, and 4, from seaward with the letters Dr.s.m. beneath the numbers in white letters.

On Ras Rongoni is a white obelisk ; on a rock N. $\frac{3}{4}$ E., about 180 yards from it is a white pyramid erected on a rock ; these in line lead up to the black buoy, No. 1.

The flags hitherto shown from the baobab tree on West Ferry point, and north extreme of a conical clump, are discontinued ; the Baobab tree has disappeared, amend line 32, p. 338, and directions, p. 339.

Too much dependence must not be placed on the buoys maintaining these positions.

Landmarks.—A conspicuous white look-out tower has been erected on East Ferry point as a signal station, and is visible about 10 miles in clear weather. The brick house with red roof northward of West Ferry point is also a good mark. The Government house and flagstaff situated near the shore between West Ferry point and Ras Chokir and the Protestant mission on West Ferry point are possibly conspicuous objects, if not hidden by trees.

Pilot.—The German authorities will provide a pilot if so requested.

Position.—Line 23.—For Sultan's flagstaff *read* observation spot on north-west side of the Government buildings. All matter

See plan, No. 674.

p. 339. relating to Sultan of Zanzibar in these pages referred to is cancelled, *see* p. 5.

p. 340. **Town.**—Dar-es-Salaam is the capital of German East Africa. The town and harbour have been much improved since they became German territory, a considerable settlement now existing here. There is also a fort with flagstaff, post office, custom house buildings and quay, two landing stages, a Roman Catholic mission, and a hospital. The Protestant mission house on West Ferry point has been already referred to.

The population (1894) was about 10,000, of whom 439 were Europeans.

Communication.—Telegraph.—Dar-es-Salaam is connected with Zanzibar by telegraph.

Mails. *See* p. 6.

p. 346. Bagamoyo (1894) has a population of about 10,000, 58 of whom were Europeans.

pp. 343-354, **ZANZIBAR CHANNEL.—Buoyage.**—The following buoys and beacons mark the reefs mentioned in Zanzibar channel.*

A red and white beacon with triangle is erected on Fungu Yasin sandhead, p. 345.

A white spar buoy, marked *Kitap*, and surmounted by two triangles points averted from each other (eastern edge mark), lies in 9 fathoms water, off the east side of Kitapumbe reef, p. 344.

A white spar buoy, marked *Bagamoyo*, and surmounted by two black triangles points upwards (northern edge mark), lies in 6 fathoms water, off the north end of Kebandahodi shoal, p. 345.

p. 346. A mast beacon surmounted by a ball, the whole painted black, is erected on the south-west side of Mbwakuni reef, in lat. 6° 22¼′ S., long. 28° 59′ E.

p. 346. Omit lines 3 to 5, and 3 and 4 from bottom, &c., all references to Arab governors, or the authority of the Sultan of Zanzibar.

pp. 343-354. A red barrel buoy, marked with an anchor, and surmounted by a white flag, lies in about 2 fathoms water, north-east of Bagamoyo station, 1½ miles from the shore, and indicates the anchorage, p. 347.

Footnote, p. 347, omit the word *possibly*.

A white spar buoy, with the word *Miko* on it in black letters, and surmounted by two black triangles, points away from each other,

* *See* Admiralty charts :—Zanzibar channel, No. 640*a* and *b*.

has been placed in a depth of about 14 fathoms at the eastern end of Fungu Miko, with Ras Windi bearing N.W. by W. $\frac{3}{8}$ W., distant $7\frac{1}{16}$ miles, p. 350. pp. 343-354.

A white spar buoy, marked *Windi*, and surmounted by two triangles points towards each other (western edge mark), lies in 7 fathoms water, westward of Windi patch, p. 350.

A white spar buoy, with the word *Wami* on it in black letters, and surmounted by two black triangles, points away from each other, has been placed in a depth of 14 fathoms eastward of the eastern Wami patch, with Bawi centre bearing S.E. by E. $\frac{1}{8}$ E., distant $10\frac{6}{16}$ miles, p. 351.

A red barrel buoy, marked with an anchor, and surmounted by a white flag, lies in about $2\frac{1}{2}$ fathoms water, E.S.E. of Saadani station, $1\frac{1}{2}$ miles from the shore, and indicates the anchorage, p. 352.

A white spar buoy, marked *M K W J*, and surmounted by two triangles points downwards (southern edge mark), lies in 4 fathoms water, at the S.S.E. edge of Mkwaja patches, p. 353.

A white spar buoy, with the word *Alek* on it in black letters, and surmounted by two black triangles, points away from each other, has been placed in a depth of 2 fathoms at the east end of Mwamba Alek, with Sange island bearing N.W. $\frac{1}{8}$ N., distant $5\frac{1}{2}$ miles, p. 354.

A white spar buoy, marked *K P M B W*, and surmounted by two triangles points towards each other (western edge mark), lies in 20 fathoms water, westward of the Kipumbwe reefs, p. 354.

Pangani bay.—Buoyage.—The undermentioned buoys and beacons are placed in Pangani bay. p. 356.

A spherical buoy, painted red and black in stripes, marked *Pangani* in white letters and surmounted by the letter P, lies in 2 fathoms, with Ras Kikokwe, north point bearing S. $\frac{3}{4}$ W., distant nearly half a mile.

A black conical buoy lies on the south side of the entrance, within or westward of the spherical buoy.

A black and red spar buoy, surmounted by a St. Andrew's cross, lies in $1\frac{1}{2}$ fathoms water, in the fairway north-east of Ras Muhesa.

Two white beacons, consisting of a vertical plank against a white wall, are situated on the shore between Ras Kikokwe and Ras Muhesa.

Two white triangular beacons are situated on the north shore of the entrance to Pangani river.

See charts, Nos. 640*a* and *b*.

p. 368. **ZANZIBAR.—Southern pass.**—A shoal composed of coral heads, about 3 cables in extent, with a least depth of $2\frac{1}{2}$ fathoms, lies off Ras Chugwani, east side of Southern pass, with the conspicuous house on Ras Buyu bearing S.E. by E. distant $1\frac{6}{10}$ miles and the north extreme of Chumbe island S.S.W. $\frac{5}{8}$ W.*

p. 369. **Ras Buyu.—Occasional light.**—An electric light is exhibited from a framework tower erected on Chugwani palace, northern part of Ras Buyu, whenever the Sultan is in residence there.

p. 370. **Buoyage.**—A black can buoy is moored in 5 fathoms water near the eastern edge of Kisiki reef, with Mbweni house bearing E. by S., distant $1\frac{4}{10}$ miles, and Conspicuous house on Ras Buyu S.S.E. $\frac{1}{2}$ E.

A red can buoy with staff and triangle, is moored in 6 fathoms water off the western edge of Mtwana reef, with Mbweni house bearing E.N.E., distant $1\frac{8}{10}$ miles, and Conspicuous house on Ras Buyu S.E. $\frac{1}{4}$ E.

p. 371. Lines 4 to 9. Masingini house is in ruins, and completely hidden by trees. A staff with flag has been placed in the foreground on the leading line, in which position it is intended to erect a white pillar. (*Raleigh*, 1894.)

Prohibited anchorage.—Amend lines 33 to 38.—The limits of the telegraph cables are marked by three beacons on top of the telegraph house, all painted black. Two are marked "cable," the other is plain. The latter in line with either of the others mark the limit of the prohibited anchorage on either side.

p. 373. **Mails.**—The information on the mail communication is correct in the volume. *See also* p. 6 of this supplement.

p. 373. **Telegraph.**—Line 14, after Aden, *add* Mombasa, Malindi and Lamu. Line 16, *add*—A submarine cable has been laid to Bagamayo, thence to Dar-es-Salaam; and another to Seychelles. Amend pp. 335 and 346.

p. 374. **Western pass.—Directions.**—Walleso house is completely hidden by the trees, and the jail no longer exists.

Lines 4 to 6 from bottom, omit and insert :—Steer in about S.S.E., midway between Bawi and Mapape reefs, until the trees around Walleso house on the brow of the hill are in line with the small house between the English Consulate and the Telegraph building, bearing E. $\frac{1}{4}$ S.

* *See* Admiralty plan of Zanzibar harbour, No. 665.

After line 2, *add*—A new palace for the Sultan has been built on the north side of the stream, situated $2\frac{1}{2}$ miles northward of Bet el Ras. It is a large white building with lofty columns, and has a metal roof. Near it are the waterworks with a tall chimney. p. 376.

English pass.—Buoyage.—The buoyage of English pass is as follows:—The buoys are now carefully attended to, and therefore less liable to be out of position than formerly. p. 377.

1. A can buoy, black and red chequered, is moored in $3\frac{1}{2}$ fathoms water on the southern edge of Seagull shoal, with white block house bearing E. by N. $\frac{1}{4}$ N., distant $1\frac{6}{10}$ miles, and large house on Bet el Ras S.S.E.

2. A black can buoy is moored in 5 fathoms water on the bank northward of Bet el Ras, with Bububu house bearing E. by N. $\frac{5}{8}$ N., distant $6\frac{1}{2}$ cables, and large house on Bet el Ras S. by E.

3. A black can buoy is moored in 5 fathoms water, about half a cable seaward of the edge of the bank off Bet el Ras, with Bububu house bearing N.E. $\frac{1}{2}$ N., and large house on Bet el Ras S.E., distant 3 cables.

4. A red can buoy, with cage, is moored in $6\frac{3}{4}$ fathoms water near the north-eastern edge of Chapani reef, with white stone pillar bearing N.E. by E. $\frac{1}{2}$ E., distant $5\frac{1}{2}$ cables, and square white house S. $\frac{1}{4}$ W.

5. A red can buoy is moored in 7 fathoms water near the eastern edge of Chapani reef, with white stone tower bearing N.E. $\frac{3}{4}$ E., distant $6\frac{1}{2}$ cables, and square white house South.

Directions.—Line 11 from bottom, *after* Ras, *add*, marked by black buoys,—

Lines 4 and 9 from bottom. Kedichi and Walleso houses are now completely hidden by the trees in front of them.

LIGHTS.—Mwana Mwana. *See* p. 152. p. 381

Mungopani lighthouse has a white top (not red), and the base of the tower is painted a dark red colour. The light is reported as feeble, 5 miles being about the extent of its range.

Ras Kizimkazi.—The intention of establishing a light here has been abandoned. The portion of the tower, 12 feet high, appears like a ruin. Omit foot note, p. 365.

Omit the second paragraph of the Caution.

See plan, No. 665.

CHAPTER X.

PEMBA ISLAND, AND THE ADJACENT COAST, BETWEEN PANGANI BAY AND THE EQUATOR.

(*Pages 388 to 398, relating to Pemba island, are hereby cancelled.*)

VARIATION IN 1895.

Pemba island, 9° 50′ W.—Tanga bay, 10° 0′ W.

PEMBA ISLAND.

pp. 388-393.

General Remarks.*—Pemba island, named by the Arabs Al Húthera (the Green), lies 22 miles north-eastward of Zanzibar island, of which it is a dependency. The Governor resides at Weti, p. 93.

It extends in a north-north-east and opposite direction for a distance of 38 miles, and is about 13 miles wide (including the islands off its western side which protect the numerous harbours on the coast).

The reef off the western side of Pemba island is generally steep-to, and less than one mile from the coast or the islets.

The eastern coast of Pemba is faced with a reef extending about half a mile off, and is apparently steep-to, with breaks opposite several creeks that indent the coast; these breaks probably afford passage in smooth weather to boats.

The height of Pemba island does not exceed 300 feet, and its surface is broken into ridges and valleys, covered with luxuriant vegetation. The soil is rich, the principal produce being cloves, most of the groves of which trees are situated on the western part of the island; £120,000 worth of this spice being about the annual export. All tropical cereals and edible roots flourish, and on the eastern side the Wapembe, or descendants of the aborigines, tend

* Derived from a Survey by Commander W. J. L. Wharton, H.M. Surveying vessel *Fawn*, 1878, and Lieut. A. Balfour, H.M.S. *Stork*, 1890. *See* Admiralty general charts:—Delagoa bay to Ras Asir (Guardafui), No. 597; Africa, east coast, sheet X., including Zanzibar and Pemba islauds, No. 664. Admiralty plans: — Kiuyu, Cockburn, George and Chaki Chaki, No. 1,812, scale $m = 1{\cdot}5$ inches; and Pemba, south-west portion, No. 1,310.

considerable herds of cattle. Cocoa-nuts abound. The island is governed by a Wali, appointed by the Sultan of Zanzibar, who resides at Chaki Chaki, the only town of any size in the island. pp. 388–398.

Pemba makes as a low island with uniform outline, and cannot be seen far by night unless by moonlight. By day it is visible from a distance of about 15 miles.

Harbours.—Chaki Chaki is the best harbour, and most easy of access; it affords shelter for all classes of vessels, and from all winds, but the depths are inconvenient for anchorage in many parts of it. Kingoje bay, Ngelema bay, port Cockburn, and port George are also good harbours, but the two latter are not so easily accessible. The best entrance to port Cockburn is through Chaki Chaki bay, by Owen channel. Port Kiuyu is also a good anchorage.

Caution.—A good look-out from aloft should be kept when entering any of the anchorages in Pemba, as shoals may exist which are uncharted; and the time for entering chosen when the sun is in a favourable position if possible. Owing, however, to the muddy state of the water at times, the shoals are not always discernible from the masthead. The bearings of Mangrove points must be used with caution as the points are liable to grow out. *See* Caution on p. 92.

The tide runs strong in all the gaps except that of Mesale.

PEMBA.—SOUTH-WEST AND WEST COASTS.—The south-west side of Pemba island, westward of Ras Upembe, is fronted by a detached sunken reef, some 10 miles in length, on which are several islands and rocks above water. Between this reef and the coast is the Upembe passage, which is much used by dhows. A description is here appended, but the chart will afford more information than a written description of these passages.

Ras Upembe, the south point of Pemba, is a bold cliffy point 15 to 20 feet high, clear of bushes for 50 to 100 yards from its outer edge. It is steep-to and the sea breaks heavily against it at times. The small sand beach on its western side is very conspicuous from the south-westward. Upembe passage lies close westward of it.

Two miles northward of Ras Upembe is the eastern entrance of Upembe passage, which is marked by a small coral islet about

See chart, No. 1,310.

pp. 388-398.

15 feet high. Between the islet and Ras Upembe are two white sand beaches.

Clump.—A little northward of the east entrance to Upembe passage is a conspicuous clump of trees 80 feet high. It shows clear of Ras Upembe on a N.E. ¼ E. bearing.

South Ras Domoni and Observation point, the entrance points of the bay north-westward of Ras Upembe, are cliffy, overhanging coral projections, with bushes close up to the edge of the cliff.

Hinsuani islet, 54 feet in height, and the twins 31 and 28 feet high, are wooded islets, with cliffy coral overhanging shores, situated on the reef at about one mile westward of Ras Upembe. The reef dries around them at low water.

Miugani islet, situated 2 miles westward of Hinsuani islet, is 50 feet high, thickly wooded, with an overhanging cliffy coral islet 30 feet high on its north side. The surf breaks against at high water, but at low water the reef dries for some distance round it.

Ras Miugani, (Saïd point) the southern point of the island of Pansa, is a bold cliffy coral point 40 feet high; it has a conspicuous white sand beach on its western side. The surf breaks against it at about half tide.

Yombi, Pansa, and Matumbene islands, and the three between, are practically the same island, being only separated by mangrove creeks, which are available for boats at high water. They are all thickly wooded and about 100 feet high.

On the south-west side of Matumbene island there is a long white sand beach, backed by a grove of casuarina trees.

There are several other islets and rocks on the reef off Matumbene island, but they are not easily distinguished, and generally appear as part of the coast.

Panani or White islet, 55 feet high, westward of Pansa, has a cliffy coral shore and is covered with bushes and trees: the highest part being a clump of dead white trees. It is very conspicuous from the south-eastward, and shows clear of the land on a W.N.W. bearing.

See chart, No. 1,310.

Sumwago islet, a bare coral islet with overhanging cliffs 20 feet high, westward of Matumbene, stands well out on the reef and shows clear of the main island when seen from the southward. pp. 388–398.

Matumbe Makupa (Soleman island), situated 2 cables northward of Matumbene island, is 149 feet high and thickly wooded, with cliffy coral shore on the western side. The reef dries between it and Matumbene.

Middle islet, 16 feet high, shows conspicuously between Kwata (Brisk island) 25 feet high, and Matumbe Makupa.

Barue (Matumbuu) rock, 35 feet high, is covered with bushes and has coral cliffy shores. It shows well clear of the main island from both north and south.

Makungwi island, the north-easternmost of the group is $1\frac{3}{4}$ miles in length, east and west, between which and the coast of Pemba is Upembe passage. The island is partly cultivated, has several low hills, and the tops of the cocoa nut trees are about 100 feet above high water.

Depôt.—Anchorage.—There is fresh water at Pochin beach, near the north extreme of Makungwi ; and a depôt established for H.M. boats cruising. There is anchorage about $1\frac{1}{4}$ miles northward of the depôt with the west extreme of island S.W. by S. and easy extreme S. by E. $\frac{3}{4}$ E. in about 10 fathoms. The anchorage, for small vessels only, should be carefully approached on the latter bearing.

Reefs.—The fringing reef curves gradually round outside the above-mentioned islands and always breaks. It is steep-to, and its outer edge dries at low water. Abreast Pansa, there is a passage inside for a short distance. The deep water is easily seen, as the bottom is of white sand. Slave dhows make use of this passage to land in the bay westward of Pansa island.

Northward of Kwata and Makungwi islands the reef, broken in places, and irregular, extends from one to $1\frac{1}{2}$ miles. Within Makungi is the Upembe passage mentioned below.

The coast northward of Makungwi to north Ras Domoni, south point of Kingoje bay, is fronted by reef dry at low water to nearly $1\frac{1}{2}$ miles in places, and with not more than 3 fathoms at 2 miles off shore.

See chart, No. 1,310.

pp. 383–398.

Dhow passages.—Upembe passage.—Between the islands above mentioned, and Pemba, the space is filled with reefs and narrow passages much used by dhows and by the cruising boats of H.M. Ships. The principal channel, from the northward, is between Makungwi island and Pemba, thence along the coast of Pemba to Ras Upembe. It is known as Upembe passage.

There are two entrances from the southward to Upembe passage, the principal one being close westward of Ras Upembe, but at about one mile northward of that point it is almost blocked at low water springs.

H.M.S. *Stork* anchored head and stern in the south end of the passage, west of Observation point, but the tides were very strong and the holding ground bad.

Kangani (Fufuni) village lies near the coast about 2 miles northward of Ras Domoni; fowls, eggs, &c. are obtainable, but the water is bad.

Current.—The current divides south of Ras Upembe, off the entrance of Upembe channel, and follows the line of coast to north-east and north-west with a velocity of one to 3 knots an hour, during the north-east and south-west monsoons, respectively. There are heavy tide rips at the dividing of the current, especially when met by the ebb stream running out from the passage westward of Ras Upembe. Off Barue rock (the Western islet of those before mentioned,) and extending for about two miles to the northward there is constant rippling and occasionally overfalls.

ANCHORAGES.—Kingoje bay, between North Ras Domoni and Ras Kingoje, the east point of entrance to Chaki Chaki bay, is 2 miles wide, but the navigable channel is reduced to half a mile between the reefs which extend about 2 miles westward of Ras Domoni (before mentioned), and the south extreme of Mwamba Kisima. The latter dries at low water springs for the distance of $1\frac{1}{2}$ miles westward of Kingoje point, and there is not more than 3 fathoms at 2 miles from the point.

Kingoje bay, within North Ras Domoni is reduced by the shoals which encumber it to a breadth of about 2 cables east and west, over a length of about 5 cables, in which space there is a depth of 6 to 7 fathoms, over mud, affording secure anchorage for moderate draught vessels. It is also a capital anchorage for boats, from whence the east coast of Pemba can be reached by the Upembe passage.

See chart, No. 1,310.

Large vessels should anchor farther out in about 11 to 13 fathoms, south-westward of Ras Kingoje. Vessels should be navigated from aloft, as no definite marks are available. The best time for entering is naturally with the sun astern or in the afternoon. pp. 388-398.

Ngelema bay close northward of Kingoje point, and the bight in the reefs abreast Ras Bandao, southward of Kingoje bay, also afford good anchorage; but like Kingoje bay, the pilotage must be done from aloft and with the sun in a favourable position. *See* directions, p. 89.

CHAKI CHAKI BAY is included between Mkumbuu peninsula, Ras Kingoje, and the reefs of Mesale island.*

Though there are many shoals in it, there are also large clear spaces and it affords many good anchorages. The eastern part gradually contracts to the mangrove creek on which Chaki Chaki town stands, 9 miles distant in an easterly direction from Mesale island.

The shores of this bay are richly cultivated with cocoa-nut trees, cloves, and cereals.

Ras Kingoje, is the southern limit of Chaki Chaki bay. It is a low point, and not easy to recognise from the westward.

Mwamba Kisima extends 1½ miles westward of Ras Kingoje, and together with the shoal ground extending half a mile west of it must be avoided when entering Chaki Chaki bay.

Ras Tundauwa, distant 3 miles north-eastward of Ras Kingoje, is low and fringed with mangrove trees. There is a watering place on the north side, half a mile from the west extreme of the point.

Shoals.—The north extreme of the shoal with a depth of 3 feet, extending westward from Fungu Sisimizi, south side of entrance to Chaki Chaki anchorage, is situated with Ras Tundauwa bearing S. by E. distant 1 1/10 miles. The south limit of the same shoal, about its centre, lies with Ras Tundauwa S.S.W. ¼ W., distant 6 cables.

The patch situated 7 cables N.W. by W. from Ras Tundauwa, extends about 1½ cables farther north-eastward than was formerly chartered. It is composed of coral and is awash in places at low water. Its north-east extreme lies with Ras Tundauwa about S.E. ½ S., distant 7 cables.

* *See* Admiralty plan of West coast of Pemba island, No. 1,812; scale, *m* = 1⅛ inches.

pp. 388–398.

A rocky patch, of 6 feet, lies with Ras Banani white chimney S. 86° E., and Ras Tundauwa S. 52° W., distant $4\frac{3}{4}$ cables.

Ras Banani, situated on the south side of the entrance to Chaki Chaki inlet, $2\frac{1}{2}$ miles eastward of Ras Tundauwa, is also low, but tolerably clear of bush. On it there is a white chimney resembling a beacon, which formerly showed well when the sun was in a favourable position; owing to the growth of the trees, it is not now visible until near the anchorage. There is another white chimney about a third of a mile south-west of that on Ras Banani.

Mkumbuu is a narrow peninsula that divides Chaki Chaki bay from port Cockburn. It is of an uniform height of 50 feet, and has many cocoa-nut and palmyra palms. Its western extremity is formed by high mangrove trees.

Dongo Kundu is a narrow wedge-shaped projection of bright red sandstone, which extends from the south side of Mkumbuu peninsula, and is a conspicuous object. There is another patch of red cliff, half a mile north-west of it, conspicuous in some lights.

A patch of $2\frac{1}{2}$ fathoms has been found off the south-east extreme of Mwamba Mkumbuu, with Dongo Kundu bearing E.N.E. distant $1\frac{4}{10}$ miles. The 5 fathoms edge of Mwamba Mkumbuu south-east extreme, lies N.N.E. $\frac{1}{2}$ E., $3\frac{1}{2}$ cables from it, or about 2 cables eastward of the flat as originally charted.

Mesale island, on the west side of the entrance to Chaki Chaki bay, is low, covered with dense forest which attains a height of 70 feet above the sea, and is about one mile in length.

Mesale island is situated on a reef which dries for the distance of about 6 cables south-westward and south-eastward; on these sides also shallow water extends some distance from the edge of this reef, but on the northern side it is steep-to. Northward from Mesale island the reef extends about one cable off, forming the south side of Mesale gap.

Mesale island appears to stand out well from the land behind, when seen from any direction.

Position.—The observation spot, north-east extreme of Mesale island, is in lat. 5° 14′ 9″ S., long. 39° 36′ 18″ E.

See plan, No. 1,812.

Target and Torpedo practice.—In the north-east monsoon period, the space southward of Mesale island is said to be the best place for torpedo practice (H.M.S. *Blanche*, 1892), and in the south-west monsoon under Ras Kiuyu north end of Pemba. pp. 388–398.

Mesale gap, situated north of Mesale island, and between it and the reef of Uta-wa-limani, is deep, but is not recommended, except at low water and when the sun is in a favourable position, as the reefs on either side are not steep-to, and sometimes do not show well. No leading mark can be given for this channel.

Anchorages.—Directions.—To enter Chaki Chaki bay ; bring Ras Tundauwa to bear E. ½ N., when the white chimney on Ras Banani (*see* p. 88) will be in line with it ; steer in on this bearing until the left extreme of Mkumbuu peninsula bears N.N.E. ½ E., thence for that extreme until the south point of Mesale island bears West. Steer East from this position, with a somewhat remarkable hill with a flat top covered with cocoa-nut trees known as Mifuni hill, directly ahead, until Ras Kingoje bears S.S.W. ¾ W., or Dongo Kundu N. by E.; thence E. by N. ½ N. between the reefs on either side until Dongo Kundu bears N.N.W., when steer E. by S. until Dongo Kundu bears N.W., when anchorage may be taken in about 10 fathoms as charted. Vessels can proceed farther in, but the 3-fathom patch half a mile off the eastern side of the bay should be given a wide berth.

Or to proceed to the anchorage south-west of Ras Tundauwa, when the south extreme of Mesale island bears West as before, steer E. ¾ S. with a large castellated house in Chaki Chaki town, seen over a mangrove islet in the centre of the narrows west of Ras Banani. This will lead to the anchorage in 8 fathoms, with Ras Tundauwa about S.E. by S. distant 8 cables. If the shoals can be made out, a vessel can go farther to the south-eastward.

The anchorage in Ngelema bay, southern portion of Chaki Chaki bay, from a position south-eastward of Mesale, may be steered for when the conical hill (255 feet) bears E. by S. ¾ S., until Ras Kingoje bears S.S.W., whence steer S.E. for the western 100 feet hill, until Ras Kingoje bears S.W. by W. ½ W.; here is anchorage in about 8 fathoms. *See* caution, pp. 83 and 92.

The one fathom patch, charted 1 3/10 miles N.E. ½ N. of Ras Kingoje, dries 2 feet at low water springs.

See plan, No. 1,812.

pp. 388–398.

Good temporary anchorage may also be obtained in the north-east monsoon period, or during calm weather, on the bank south of Mesale island in 6 fathoms.

Chaki Chaki is a long straggling town picturesquely situated among mango and cocoa-nut trees at an elevation of 40 feet above high water.

There is a dilapidated fort in the town which is not conspicuous but some of the stone houses show very clearly from Mesale island, especially the northernmost one, which is castellated.

The town cannot be approached at low-water springs even in the smallest boat, the creek drying completely across, but at half tide there is a sufficient depth of water for a steam pinnace.

Supplies.—A contract has been made here for the supply of beef, bread, and vegetables.

PORT COCKBURN is a harbour of great capacity, though much obstructed by reefs, and in many parts having inconveniently deep water. Long bays and creeks indent the shores, in some of which good anchorage can be found; Kokota, Funzi, and Pembe islands divide port Cockburn from port George. Port Cockburn may be entered either by Owen channel or Kokota gap. This port is much used as a head quarters for H.M. ships cruising.

Owen channel, leading from Chaki Chaki bay to port Cockburn, is deep, but contracts at one part to a width of $3\frac{1}{2}$ cables between the 3-fathom lines. It lies between Uta-wa-limani and the reefs north-eastward of it, and the reef extending from Mkumbuu peninsula. No good leading marks can be given for this channel, but at low water, with care, by the aid of the Admiralty chart, there should be no difficulty in its navigation. The following marks, taken partly from the chart, may prove of some value. From abreast Mesale island steer in with the north-west extreme of Uvinje island, in line with the east extreme of Kashani island, N. by E. $\frac{1}{4}$ E., which leads in mid-channel, until the north extreme of Mkumbuu peninsula bears E. $\frac{1}{2}$ N., thence the course is about E.N.E., allowing for tide, and keeping about 2 cables from the edge of Mwamba Mkumbuu, until abreast the sand bank, which dries 8 feet, thence as requisite. *See* caution, p. 92.

See plan, No. 1,812.

A patch of $1\frac{1}{4}$ fathoms, with 6 to 7 fathoms around, has been found northward of the fairway in Owen channel, with south-east extreme of Mapanya bearing N. by E. distant $1\frac{2}{10}$ miles, and north extreme of Mkumbuu peninsula S.E. by E. $\frac{3}{4}$ E. pp. 388–398.

Mwamba Mkumbuu is an extensive reef extending west from Mkumbuu peninsula; its south-west extreme, on which are isolated patches dry at low-water springs, is situated $1\frac{1}{2}$ miles from the peninsula; it shoals very gradually from seaward, and is difficult to distinguish.

Uta-wa-limani is a long reef extending from Mesale gap to Vikunguni islands, a distance of 4 miles in a northerly direction. This reef is tolerably steep-to on its western edge, but to the eastward it slopes gradually. It dries in places, principally at the southern part.

Vikunguni and Kashani islands are both long, narrow, and rocky, being situated on the outer edge of the sea reef $4\frac{1}{2}$ miles northward of Mesale island. Off the south extreme of Vikunguni the three islets, 15 feet high, are very conspicuous.

Mapanya island is rocky, with one or two baobab trees, 30 feet high, that show conspicuously above the other trees; it is situated on the eastern horn of the same reef as the Vikunguni islands.

Kokota island, separated from Kashani and Mapanya islands by Kokota gap, has a rocky sea face, and is covered with moderately high vegetation, but has a very few palm trees upon it.

Funzi island, situated three-quarters of a mile eastward of Kokota, has a central plateau 40 feet in height, covered with lofty palmyra palms and cocoa-nut trees to about 100 feet in height. There is a well on the north side of this island. *See* anchorage off north side, p. 93.

Depôt.—There is a Naval depôt here, and also a cemetery at the south-east extreme of the island.

Supplies.—Fresh provisions are obtainable from the large village on Ras Kinazini, north shore of port Cockburn.

See plan, No. 1,812.

pp. 388-398.

Shoals.—A patch of 4 fathoms or less, with 10 fathoms close to, lies with the east extreme of Funzi bearing N.N.E. ¼ E., and south extreme W. ½ N. A patch of 5 fathoms is also charted about 3 cables south-eastward of it.

Another small patch with a depth of 5 fathoms, and 7 to 9 fathoms around, lies with south extreme of Funzi W. ⅜ N., and east extreme of Pembe island N. by W. ½ W. distant 7 cables.

Caution.—As the survey on which the plan of these harbours is based was broken off by the ship being ordered elsewhere, before it was completed, it is very possible that other unknown small dangers may exist.

Pembe island, lying eastward of Funzi, is somewhat like it in appearance, but smaller, and has more mangrove trees round it. Some red cliffs at the south-west extreme are conspicuous.

Directions—Kokota gap is a passage from seaward through the outer reef into port Cockburn, passing northward of Kashani and Mapanya islands, and south of Kokota island. This gap is deep, with well defined edges that dry at low water. About half a mile eastward of Mapanya island are situated two large coral banks, with 4 feet water on the southern and about 10 feet on the northern. The best passage is between these banks, which do not always show well. The east end of Kashani well open of Kokota leads between these banks, as does also the west end of Kashani, touching the north extreme of Mapanya; but it is recommended to navigate at low water by the eye, with the aid of the Admiralty chart. Within the gap, the same method of proceeding must be adopted, to the required anchorage.

The best entrance appears to be through Chaki Chaki bay and Owen channel, before mentioned.

The passage between Kokota and Funzi is not recommended, as it is narrow and intricate. Between Funzi and Pembe is a boat passage; between Pembe and the mainland it dries at low-water springs.

Good objects for fixing the position of the vessel, when approaching or leaving Weti anchorage, are Pasi island, the house at the watering place at Mtambwi, and the rock 20 feet high off the east side of Fundu; probably the 20 feet rock off the south point of Fundu is also a useful mark for navigating the channel.

See plan, No. 1,812.

Caution.—It is advisable to navigate all the gaps at low water. pp. 388–398.

Anchorages.—To proceed to the anchorage northward of Funzi island,—from nearly abreast the north-easternmost 10 feet rock on chart, south-east of Uvinje island, steer to bring this rock only just open southward of a tall tree situated nearly 4 cables within the south extreme of Uvinje island, bearing W. by N. $\frac{3}{4}$ N. This mark astern, leads in mid-channel. When the west extreme of Pembe island bears S. by E. $\frac{1}{2}$ E., anchor in about 12 fathoms, or haul towards the island on that bearing until the rock eastward of Kokota is just open northward of it.

There is a good anchorage in port George in 8 fathoms off Mkia-wa-Paca, with Pasi islet bearing S.W. $\frac{1}{4}$ S., and the north extreme of Uvinje island bearing W. by N. $\frac{1}{4}$ N.

Weti harbour.—Weti harbour affords secure anchorage in depths of about 4 fathoms abreast Ras Tungwi, gradually increasing to 10 fathoms at one mile westward of that point. The entrance is about a quarter of a mile wide between the reefs on either side.

A custom house is situated near Chozini. A small boat slip has been made at the watering place at Mtambwi, within Ras Tungwi. The chief or provincial administrator resides at Weti.

Supplies.—Good supplies are obtainable at Weti. A chief, whose acquaintance should be sought, resides at the conspicuous house at Mtambwi within Ras Tungwi.

Directions for port George and for reaching Weti outer anchorage are given on p. 92. To enter Weti harbour, a vessel must be guided by the reefs on either side which probably are all visible from aloft when the sun is favorably situated; or a boat must be sent ahead.

PORT GEORGE is a large harbour somewhat similar to port Cockburn, but more obstructed by reefs. A long and tortuous creek, similar to that at the eastern part of Chaki Chaki bay, extends inland for some distance from Weti at the north-east corner of this inlet. The shores of port George are densely populated and well cultivated.

The western side of this extensive harbour is formed by the islands of Uvinje and Fundu, southward of which is Uvinje gap, the principal entrance. *See* Anchorages above.

See plan, No. 1,812.

pp. 388–398.

Pasi islet, 20 feet high and covered with scrub, is situated in the centre of the southern part of port George.

A patch of 2½ fathoms, coral, with 6 to 8 fathoms around it, was found by H.M.S. *Penguin*, 1888, in the anchorage southward of port George, with Pasi islet bearing N.W., distant 9½ cables.

A depth of 4 fathoms over sand and coral lies just without the 3 fathoms contour northward of Funzi, with the extremes of that island bearing N. 88° W., and S. 4° W.

Uvinje island, on the western side of the channel, and abreast Pasi islet, is a rocky island on the outer reef, separated from Kokota island by Uvinje gap. It is covered with scrub and has several clumps of tall casuarina trees. On its western side are several sandy coves where boats may land at high water.

Fundu island is the largest of the outlying islands which form the western side of port George, being 5¼ miles in length and half a mile in breadth. It is flat, without any conspicuous feature, partly cultivated, and has large groves of palmyra palms. There are many small sandy bays on the western shore of Fundu island.

Haramu passage, between Uvinje and Fundu islands, affords at half tide a boat passage. At low-water springs it is dry.

Directions.—Uvinje gap leads into port George northward of Kokota island, and is a perfectly clear channel, safe to navigate when the sun is in a favourable position. A vessel when entering should keep along the edge of the reef on the northern side of the channel until abreast of Pasi islet, to avoid the detached coral shoal north-eastward of Kokota island. There are two small grass-covered rocks on the reef which forms the north side of the channel; the western (a double rock 10 feet high) is about 30 yards within the edge of the reef. The eastern rock, also 10 feet high, is situated about 2 cables within the edge of the reef.

From abreast Pasi island, gradually bring the two grass-covered rocks just mentioned in line astern, bearing S.W. ½ S., this mark will lead to the entrance to Weti harbour. When Ras Ukunjwi bears North, or the point eastward of Ras Tungwi is open, steer E.N.E. for about half a mile to Weti outer anchorage.

See plan, No. 1,812.

Inner passage.—The passage from port George northward to port Kishi Kashi, is shallow, and is not recommended, though available for vessels of 10 feet draught. pp. 388–398.

KISHI KASHI PORT is small and much obstructed by reefs ; it has a somewhat intricate entrance, for though the outer part of the channel (Fundu gap) between the islands of Fundu and Njao is deep and straight, it is narrow, being in one place only about half a cable in width, and the sides are not quite steep-to : the passage also turns sharply to the southward immediately the gap is passed.

If Kishi Kashi port were properly buoyed it would be an excellent harbour, but being without natural leading marks, boats should be anchored on the edges of the reefs in order to enter with safety. It is advisable to anchor in the south-east part of the harbour, where there is most room for swinging and no current is experienced. A beacon is being erected at Kishi Kashi to better mark the entrance to Fundu gap.

At Kishi Kashi port the chief of the Pemba Arab aristocracy resides. He owns all the north part of Pemba island.

Njao island, situated northward of Fundu island, between which is the entrance to Kishi Kashi port, is similar to Fundu in appearance. Fundu rock, about 30 feet in height, stands on the edge of the reef near the centre of Njao island, but only shows clear of the island when very close in.

PORT KIUYU is a more available harbour than Kishi Kashi port. The entrance is wider, and the clear space inside larger and more directly opposite the entrance. A good berth is in 12 fathoms with the south point of the main island eastward of Njao island, bearing S.W., and the north-east extreme of Njao island bearing N.W. ¼ N.

Many creeks and bays indent the shores of port Kiuyu, but they are all shallow.

The shores of port Kiuyu are not so thickly inhabited as those of the harbours southward of it.

Directions.—Njao gap leads from seaward into port Kiuyu. The sides are well defined, except at the southern entrance point, where the reef extends 3½ cables from the shore, and shallow water extends some distance from the extremity of the reef. The reef on the northern side of the channel is steeper.

See plan, No. 1,812.

pp. 388–398.

There is no difficulty in entering Njao gap at low water, by navigating from aloft, as the shoals are plainly discernible on either side. The last of the ebb sets towards the south side of the entrance. The former marks for entering have disappeared.

NORTH COAST.—Northward of Njao gap the coast is nearly straight, with occasional little sandy bays, to Ras Kegomacha.

Aspect.—The appearance of the north coast of Pemba island is that of a low tree-covered country, the outline being very uniform; the only point which can be recognised being the low clump on Ras Kegomacha.

Pemba island is safe to approach at night from the northward at a moderate speed and with the lead going. The Pemba knolls are described on p. 97.

MSUKA BAY is situated immediately east of Ras Kegomacha, the north-west extreme of Pemba island, and is a good anchorage, protected by reefs on nearly all sides. During the north-east monsoon a swell fetches home, but even then it is a safe anchorage, Msuka is the name of the district on the shores of Msuka bay. A good many dhows are built here.*

Ras Kegomacha is a rocky point with a conspicuous clump of trees 60 feet in height.

Kegomacha reef dries for a distance of 2 miles north-eastward of Ras Kegomacha; the discoloured water northward of this reef makes it appear more extensive than it really is. A sand cay, situated 6 cables northward of Ras Kegomacha, dries 10 feet at low-water springs.

Directions.—To enter Msuka bay from the southward, do not round Ras Kegomacha until Ras Kiuyu, the north-east extreme of Pemba island, bears S.E. by E. $\frac{1}{4}$ E., to clear Kegomacha reef, thence as requisite by cross bearings; anchor in 6 fathoms with Ras Kegomacha bearing N.W., and Ras Kiuyu E. $\frac{3}{4}$ S. The swell is troublesome here at times, as above stated.

Sisini creek, situated about $4\frac{1}{2}$ miles south-eastward of Msuka bay, is a long but shallow inlet, with several islands and villages.

* *See* plan of Msuka bay on No. 1,812; scale, $m = 0{\cdot}5$ of an inch.

Sisini village lies at the head of the inlet. There is good shelter for dhows in this inlet. Fruit, poultry, eggs, and yams are obtainable at Pajii, off which there is good boat anchorage. pp. 388 398.

Ras Kiuyu, the north-east extreme of Pemba island, is a rocky promontory covered with bush, and faced by cliffs about 20 feet in height. On the north side of the point the reef extends but a short distance from the coast, and the anchorage north-west of the point is unprotected.

Pemba Knolls.—The space between Ras Kiuyu and Ras Kegomacha, is occupied with numerous reefs, known as the Pemba Knolls.

The eastern of these only dry at low-water springs, but always break heavily.

Kundeni knoll, the northern of the group, dries 3 feet at low water, and is situated N.E. by E. distant $4\frac{3}{4}$ miles from Ras Kegomacha.

There is a bank with 4 fathoms least water, lying 2 miles N. by E. of Kundeni knoll.

Funguni knoll lying $4\frac{3}{4}$ miles E. $\frac{1}{2}$ N. from Ras Kegomacha has a large sand cay which dries 8 feet at low-water springs ; Punga Punge lies 2 miles seaward of it. Several patches dry at low-water springs lie between them and Ras Kiuyu.

The bank of soundings to the depth of 100 fathoms extends for 11 miles northward of Pemba island ; but little current is experienced when on it.

TIDES and CURRENTS.—It is high water, full and change, at Mesale island, west coast of Pemba, at 4h. 0m. Springs rise 12 feet, neaps 8 feet.

In the northern part of Pemba channel, near the coast of Pemba island, the flood tide setting to the southward neutralises and at times overcomes the constant north-going current, and the ebb accelerates it. The streams meet off Uvinje island and cause a confused sea, dangerous at times to boats. In the southern part of Pemba channel the set is always to the northward, but the amount the current is influenced by the tidal stream has not been ascertained. However, the set of the current in mid-channel is about N.N.W., from 2 to 4 knots in the south-west monsoon period, and 0 to 2 in the north-east monsoon ; towards the northern part it also sets in the line of

See plan, No. 1,812.

pp. 388-398. the axis of the channel, or about N.N.E. When at its strength it frequently causes a strong ripple near the island, having the appearance of breakers. At all times a vessel proceeding through Pemba channel will find less current near Pemba island than in mid-channel. The tide runs strongly in all the gaps except that of Mesale.

North-east and eastward of Pemba island the current sets about N. by W., or rather on to the island, and renders any estimation of position very difficult. In December (north-east monsoon period), off the east coast, it has been found as little as three-quarters of a mile an hour.

PEMBA CHANNEL.—DIRECTIONS.—The navigable portion of the channel is contracted by the Wasin and North and South Head reefs bordering the African coast, to a width of 26 miles at the southern entrance, and 19 miles at the northern, but between these dangers and the island it appears to be all deep water.

The eastern side is safer than the western, as the reef extends but a short distance from Pemba island, less current is experienced, and the land is nearer to guide the navigator; but on the other hand, Pemba island is notorious for its large rainfall, and frequently will be enveloped in rain squalls and clouds, when the western side of the channel is clear.

A steam vessel proceeding northward from Zanzibar, through Pemba channel should, from abreast Mwana-mwana island, shape course direct for Ras Kegomacha; this will allow for the strong northerly current, and lead clear through Pemba channel. *See* directions from Zanzibar, page 384 of the Pilot.

A vessel approaching from the northward, and being able to make Pemba island in daylight, is recommended to steer for Ras Kegomacha, and keep close along the eastern shore of the channel as far as Mesale island; then steer for Mwana-mwana island, allowing about 2 points to the southward for set of current.

The three islets southward of Vikunguni island, and about 4½ miles northward of Mesale island, are easily identified, and useful for checking the position of the vessel. The reef southward of them shows well with the sun to the westward.

There is nothing to prevent a vessel approaching from the northward, from passing through Pemba channel at night if the weather be tolerably clear; and as before remarked, the island may be

See chart, No. 664.

approached from that direction at a moderate speed, with the lead going, but it may be more prudent to keep well outside for the night, and steer in at daylight. pp. 388-398.

Good anchorage may be obtained on the bank extending southward of Mesale island, entrance to Chaki Chaki bay, in from 6 to 7 fathoms, if not wishing to proceed across to Zanzibar at night.

PEMBA.—EAST COAST.—The east coast of Pemba is rather low, and should be approached with care at night, but there does not appear to be any danger beyond the coast reef, which, it is stated, nowhere extends more than one mile off, and is steep-to. Within 2 miles of the coast no soundings have been obtained with the hand lead.

From Upembe passage near south extreme of Pemba island to Mtangani, a distance of about 7½ miles, the coast is over-hanging coral cliffs about 15 feet high, thickly wooded, and fronted by a reef which always breaks.

MTANGANI can only be entered by steering from aloft. The passage is clearly defined, and the water smooth as soon as the outer line of breakers is passed. The channel is three-quarters of a cable wide, and the best anchorage is inside to the westward of the point forming the south side of the entrance. H.M.S. *Stork* moored there and found little or no tidal stream. There is a passage for boats through to Kiwani and from there to seaward through Mkiwani channel, available only for boats at high water; the entrance being 3 miles southward of Mtangani.

Caution.—Care must be taken in entering or leaving Mtangani, as the current runs strongly along the edge of the reef; but as soon as the outer edge is passed, the current is lost and the tidal stream met running fairly out or in.

The reverse being the case on leaving, the current catching the ship on the bow as she passes the outer edge. So clearly is the difference of current felt, that the bows of the ship may be in the tidal stream while the stern is in the current and *vice versâ*.

Boat channel.—For about three days on either side of spring tides, there is a boat communication between Upembe harbour, northward of the island of which Ras Upembe forms the south extreme; thence along shore within the reef off Mkiwani creek. This entrance has a bar within with 6 feet at high water. Its narrowest part is but 14 feet wide, but is deep. Small dhows use this passage.

See plan, No. 1,310.

pp. 388–398.

Coast.—From Mtangani the coast, composed of cliffy, overhanging coral, with numerous indentations and a few sand beaches, inclines to the northward to Mchengangazi. It is lined with trees and bushes to within a few feet of the edge of the cliffs.

Reef.—The coast is fringed with a reef which is steep-to and generally breaks, without any off-lying dangers. The current runs northward strongly along its edge.

Mchengangazi passage, in lat. 5° 06½′ S., is a channel through the reef, about one cable wide. It must be entered by steering from aloft, the deep water being easily seen. H.M.S. *Stork* moored in 7 fathoms, 1½ miles within the south point of the entrance. The tide sets directly in and out of the passage, and care must be taken on entering or leaving when passing from the current running northward along the reef into the tidal waters, and *vice versâ*. Little or no stream was experienced where the *Stork* moored. The large open space inside dries at low water, leaving narrow creeks between. At the head of the inlet a narrow creek and boat passage leads northward past Kodian village into Adamson bay.

ADAMSON BAY.—No passage could be found leading from seaward into Adamson bay; the reef was breaking right across and the rollers setting into the bay for some distance.

There is a small coral islet off the south point of Adamson bay.

Landmark.—On the north side of entrance to Adamson bay there is a conspicuous square clump of casuarina trees, 100 feet high, remarkable by being the only trees of the kind in the vicinity.

Just off the casuarina clump is a small black islet 54 feet high, under the land and not easily seen.

The current sets northward along the coast with a velocity of one to 3 knots an hour. There is a pretty strong set into Adamson bay at times.

COAST.—From Adamson bay the coast trends nearly straight to Ras Kiuyu; it is cliffy, 15 to 20 feet high, with a few sand beaches, and covered with scrub and trees.

Haycock islet, a small bare islet 42 feet high, is situated 2 cables from the shore, and 2½ miles southward of Ras Kiuyu. It does not show very well, being close under the land.

Landmark.—At 1¼ miles southward of Ras Kiuyu, and about one cable within the beach, there is a conspicuous rounded clump of

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See plan, No. 1,310.

trees, 115 feet high. It stands above a slightly projecting point of white sand, the sand extending for nearly a mile. pp. 388 398.

Coast reef.—From Adamson bay northward, the coast reef is steep-to, extending from a quarter to one mile from the shore, with no off-lying dangers; it generally breaks. Between Ras Kiuyu and the clump just mentioned, however, rocky ground extends for some distance, with coral heads, having 2 to 3 fathoms of water over them. They do not break, and it is not advisable to approach the coast within $1\frac{1}{2}$ miles between Ras Kiuyu and the clump.

The current follows the line of reef running to the northward at a rate of one to 3 knots an hour.

THE MAINLAND.

TANGA southern approach.—South Head reef.—A white spar buoy, marked *South Head*, and surmounted by two triangles, points downwards, lies in 14 fathoms, near the southern end of South Head reef, in about lat. 5° 23′ S., long. 39° $6\frac{1}{4}$′ E. p. 399.

A beacon in the shape of a truncated cone, painted white, with a vertical red stripe, and surmounted by a flag, has been erected on Fungu Tongone, in about lat. 5° 15′ 40″ S., long. 39° 7′ 30″ E.

A similar beacon, but without the flag, has been erected on the southern of the Karange islands, in lat. 5° 12′ 50″ S., long. 39° 8′ 10″ E.

Line 10. For 1,500, *read* 916; line 13, *read* Jombo, 1,573 feet. p. 400.

Tanga bay.—Railway.—The first section of the Usambara railway was opened in 1894, from Tanga to Pongwe on the Pangani river (about 8 miles). It was expected to be open to Ngomeni, 15 miles by the end of that year. *See* Mails, p. 6. Tanga has from 3,000 to 4,000 inhabitants, about 100 of whom are Europeans. pp. 401, 402, 403.

Light.—*See* p. 152.

Buoyage.*—Red buoys mark the starboard side of the channel, entering from seaward; black buoys the port side; buoys painted in horizontal stripes mark the fairway.

A red spar buoy, with a white letter *A* and *Tanga* on it, surmounted by a topmark *A* painted white, is moored in a depth of $6\frac{1}{2}$ fathoms on the eastern side of ship channel, with Ulenge island lighthouse bearing N. 38° W., distance $4\frac{3}{4}$ miles.

A black conical buoy, with a white letter *A* and *Tanga* on it, is moored in a depth of 11 fathoms northward of Niule reef, with

* *See* plan of Mansa and Tanga bays, No. 663; also charts, Nos. 1,390 and 664.

pp. 401, 402, 403. Ulenge island lighthouse bearing N. 27° W., distant $3\frac{7}{10}$ miles; and Rocky islet north of Yambe, S. 59° W.

A red spar buoy, with letters *B* and *Tg.* on it, surmounted by a topmark *B*, painted white, is moored in a depth of 11 fathoms, southward of Ulenge reef, with Ulenge lighthouse bearing N. 14° E., distant $2\frac{4}{10}$ miles; and north-west point of Ras Kasone, S. 87° W.

The black conical buoy marking the north-west edge of the shoal ground off Ras Kasone, has a white figure *2* and *Tg.* on it.

The buoy marking the east extreme of the shoal ground off Tanga island is a red spar buoy with a white letter *C* and *Tg.* on it, surmounted by a topmark *C*.

The buoy moored at the seaward entrance of the channel between Niule and Yambe island, with Rocky islet bearing N. 30° W., distant $1\frac{1}{2}$ miles, is a red spar buoy.

The black conical buoy moored N.N.E. $\frac{1}{2}$ E., 3 cables from Rocky islet, has a white figure *1* and letter *Y* on it.

Dixon bank buoy, at the south end of the bank, is a black and white spar buoy, with *Dixon* and *Tg.* on it in black or white letters, surmounted by a black drum.

These buoys must not be depended on.

p. 403. **Kwale bay.** *See* plan No. 663. Kwale island is known as Mnasini.

Mansa bay.* situated about 6 miles northward of Tanga bay, is charted from a German Government survey of 1892.

It is nearly one mile wide between the entrance points Ras Mavemavli and Ras Mnasini, and 4 cables wide with depths of 6 to 7 fathoms. Within, it is $2\frac{1}{2}$ miles in length by $1\frac{1}{2}$ miles in width, with depths of 6 to 10 fathoms over a considerable portion of it.

Directions.—The best approach from the southward is southward of Fungu Nyama, as for Tanga, until northward of the first black buoy, whence course may be altered to pass about one mile eastward of Ulenge lighthouse and of Kwale island until abreast the entrance, when a mid-channel course may be taken into the harbour.

The channel northward of Fungu Nyama between it and the south end of Mwamba Wamba is also available. The bar connecting these reefs has a least charted depth of 4 fathoms, the best water being towards Fungu Nyama, where the depth is from 6 to 9 fathoms.

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* *See* plan of Mansa and Tanga bays, No. 663; also charts, Nos. 1,390 and 664.

Patches of about 5 fathoms are situated about one mile northward of Fungu Nyama; and Kwale bank, consisting of two banks with depths of $3\frac{1}{4}$ to $4\frac{3}{4}$ fathoms, almost midway between Kwale island and Mwamba Wamba and near the fairway of the approach, must be given a berth. The northern approach has not yet been charted. p. 403.

Boma reef, dry at low water, lies nearly three-quarters of a mile off shore, and 3 miles northward of Mansa bay.

North Head reefs.—Line 4 from bottom *add* the southern portion of these reefs is known as Mwamba Wachundo, and dries at half tide. It is vaguely reported to lie nearly a mile eastward of the position charted.

Moa (Gomani) bay,* native, Pani Kibombo, about 5 miles northward of Mansa bay, lies between Ras Kilifi and Ras Kungunganda (Mkadini), over one mile apart, but reefs, dry at low water, extend so far from these points, and from the shores of the harbour, that a very narrow channel only remains. It is available for small steamers and dhows only. The walled town of Moa and a custom house lie on the west shore of it.

Anchorage.—Fungu Kivani, with a least depth of one fathom, lies three-quarters of a mile off Ras Kilifi, the south point of Moa bay. There is anchorage in about 15 fathoms between it and the point.

MOA BAY to CHALE POINT.†—General remarks.— From Ras Kungunganda north-eastward to Chale island the land is low and well wooded, from which an occasional clump of trees and the islands off lying the coast stand up more prominently than the generality. The shore is alternately sand beaches and rocky, with mangrove frontages, and invariably a fringing reef. Between Kungunganda and Wasin island a bay is formed, fronted with broken reefs, containing in its centre the island of Sii, and in its north-west part the town of Vanga on a small river of the same name. This vicinity is more cultivated than the northern, viz., from Wasin to Chale, which latter coast is open, with the frontage partaking more the nature of a sunken barrier, from which and from the outer reefs of Wasin bay the 10-fathom line is no great distance; while the 100-fathom line is, speaking generally, within one mile of the 10-fathom line, and is shown by ripplings in calm weather and a confused sea during strong winds. pp. 403–416.

* *See* Admiralty chart, Chale point to Pangani, No. 1,390.

† Information herein, on the coast between Moa bay and Ras Ngomeni, is from the surveys and remarks made in H.M.S. *Stork*, 1889–90, and cancels the last three lines on page 403 and pages 404 to 416, line 24.

pp. 403. 416.

Landmarks.—This strip of coast is by no means thickly populated; Vanga, Wasin, and Funzi being the only places of any size. It is drained by several small rivers navigable by the smaller class of dhows for a mile or so; and the background is marked by the following hills, forming the first land made in clear weather, viz. :— Kilulu, of 916 feet, situated 5 miles inland from Ras Kilifi, a rounded hill at the northern end of a coast range of half that elevation; Jombo, 1,573 feet, and Mrima, 1,052 feet, isolated conical mountains 16 and 12 miles respectively north-west of Wasin, with the conical hill Kiruki, 622 feet, about 2 miles eastward of the latter. Jombo is very sharp, whilst Mrima is more truncated.

Tides and currents.—The current is very slightly felt inside the reefs and along the shore, but sufficient to make the ebb stream that sets to the eastward through the Wasin channel run between $1\frac{1}{2}$ and $2\frac{1}{2}$ knots during springs, whilst the returning flood either neutralises or slightly overcomes it.

It is high water, full and change, in the Wasin channel at 4h. 0m. Springs rise 12 feet and neaps 8 feet; neaps range 4 feet.

Winds and Weather.—In the three months, June, July, August, 1888, the weather off this coast was as follows :—

		Winds.				Bar.		Ther.	
		S.W.	S.	S.E.	Calm or variable.	in.	in.	°	°
June	(days)	28	2	0	0	30·08 to	30·40	70·5 to	80·5
July	„	15	6	5	5	30·15 „	30·32	72 „	80
August	„	22	2	2	7	30·11 „	30·32	70·5 „	79·2

In June the rain fell on 16 days, and decreased as the season advanced; it fell generally between the hours of 6 and 11 a.m.

Coast.—Between Ras Kungunganda and the mouth of the Yimbo river lies Kirui island, about 5 miles in length, the sea coast of which is low and rocky, with half a dozen sandy spots. There is a canoe passage within it as mentioned below.

Yimbo river is the southern of a series of mangrove-lined water-ways, and is 200 yards wide at the entrance. It is barred at low water by reef and sand, with from one to 2 fathoms within,

See chart, No. 1,390.

gradually decreasing in width and depth until, at 3½ miles from the bar, the steam whaler of H.M.S. *Stork* could go no further towards Moa bay, but there is a passage for canoes at high water only. The island, seaward, is known as Kirui. pp. 408, 416.

The village of Yimbo, situated in a grove of cocoa-nuts on the northern bank, a third of a mile from the mouth, is partially stockaded, and consists of 60 huts and about 200 inhabitants. It is poorly supplied with water and provisions, but fish is plentiful.

Umba river joins the Yimbo from the north-westward at one mile from the sea. It is the only actual river in this neighbourhood, its water being fresh at half a mile above its junction with the Yimbo. It is said to extend northward for one day's march, and then trend to the westward for four days; 2 miles from the coast it runs between high banks 15 yards apart, and through a well-cultivated country; though deep during the rainy it is very low during the dry season, and does not appear navigable at any time. The tide is said to reach to Yasini, about 2 miles above Yimbo, where the river is 20 yards across, but at low water it is dry down to its mouth.*

Boundary.—The mouth of the Umba is the boundary on the coast between the British East African Company on the north, and German Territory on the south.

Vanga creek and town.—Vanga creek or Hori Vanga, at 1½ miles northward of the Yimbo, is much smaller and similarly barred. Amongst cocoa-nuts near the entrance, on the south bank, are the ruins of the old town of Vanga, the present town being on the same bank and one-third of a mile further up. Abreast the town the creek is 100 yards wide at high water, at which time its windings can be followed for 3½ miles, where it is lost in the swamps; at this distance there was a depth of 12 feet at high water, but landing was impossible. The town is walled and stockaded, contains a small and miserable fort, two or three mosques and about 1,500 inhabitants, the whole in charge of an Akhida (Captain) and 15 to 20 Arab soldiers. It is very dirty, has a mangrove swamp at its back, and must be very unhealthy. Provisions are obtainable, and there are several wells, but in the dry

* Additions from Report of Commander Arbuthnot, H.M.S. *Mariner*, 1889.

See chart, No. 1,390.

pp. 403–416.

season the people have to send to the Umba river, some two miles, for their water, where also are their provision grounds and a large rice cultivation, much of the latter being exported to Zanzibar. Farther back are several small villages of the Udigo tribe, the names of which are given on the chart. *See* Directions, p. 108.

Juma, Allene, and Pongwe rivers.—In the bay north and eastward of Hori Vanga and Sii island, are the rivers Juma, Allene, and Pongwe, with collections of huts here and there, and near the Alleyne a fairly large cultivation of corn. The chart shows a depth of 3 feet on the bar of the Juma, with one fathom within it. The Pongwe apparently has no bar, and depths of not less than 2 fathoms are shown as far as Kiwe, 1½ miles above the entrance. Hippopotami are to be met in these rivers, and fish are plentiful.

Sii island, situated on the north side of the approach to Wasin from the south-westward, is uninhabited and thickly wooded with mangrove trees that rise in its centre to a height of 95 feet; it is one mile long, half a mile broad, and stands on a long coral reef in the middle of and connected with the north shore of the bay, the latter being completed by a fairly straight run to the eastward of 6 miles of mangrove fronted coast from Ras Kiromo to Ras Wasin, and forming the north side of Wasin channel.

WASIN ISLAND and reef.—Trending parallel with and about one mile southward of the coast westward of Ras Wasin, is the coral island of Wasin, the principal hereabouts, and from the southward not easily discernible, whence it looks as if it blended with the mainland; Wasin channel between is clear, and affords good anchorage ground. The island is 3 miles long, east and west, and one mile broad, the trees on it giving an elevation of 70 to 90 feet; one large cotton tree of 94 feet in the north-west part, and two casuarina trees in the middle of the south shore being especially prominent. The fringing reef, of no great extent on the north and east sides of the island, extends off three-quarters of a mile to the southward, and so far to the west-south-westward, viz. 3 miles, as, with the Howard rocks north-west of it, and the reef extending east and south of Sii island, to contract considerably the navigable waters. This south-western portion of the Wasin reef is named Cha, and furnishes a large collection of cowries.

See chart, No. 1,390.

The town of Wasin, which has seen better days, now consists of two mosques, three wells, and about 220 huts, with 350 inhabitants; it is situated at the north-west extreme of the island. The water on the island is brackish, nearly all for drinking purposes being brought from wells on the mainland abreast the town. The provision grounds of the inhabitants are also on the mainland; but they are great fishermen, which, with the protection afforded by the island from the periodical raids of the inland tribes, is their great inducement to live on the island. pp. 463 416.

A reef fronts the bight in which the town is situated, rendering landing awkward at low water.

In Wasin channel, at half a mile westward of Ras Wasin, and close to the shore, is a small islet like a haycock, named Shungilunzi, 30 feet high; 1½ miles west of which, and within 2 cables of the shore, is a small sand cay on the outer edge of the shore reef, here projecting slightly.

Supplies.—Bullocks, sheep and fowls, may be obtained at Wasin, but no fruit or vegetables. Gazelle are to be shot in the neighbourhood. Fish may be had in abundance with the seine.

Islets and reefs southward of Wasin.—Three-quarters of a mile southward of the east end of Wasin island is a group of wooded islets named Pungutiachi, 55 feet in height, on the eastern of which are two prominent fir trees; and three-quarters of a mile farther southward the larger island of Pungutiayu, also wooded to the same height; there is a channel between them, with depths of 5 to 10 fathoms. This group is a distinct feature in making the land hereabouts, a less prominent one being the small islet Kisiti to the westward, on which are a few weather-beaten bushes that rise to 12 feet above high water. Very strong tide rips are found off these islets, and in any weather there is a heavy tumble on.

The reefs in the bay, to the westward of Wasin, are as follows:—

Mwezi, 1¾ miles north-eastward of Ras Kungunganda, small and uncovering 2 feet, with a good passage about three-quarters of a mile wide inshore of it.

Minyani, two reefs 2½ miles northward from Mwezi, and which show distinctly; there is a passage (not recommended) inshore of them.

See chart, No. 1,390.

pp. 403–416.

Kipwa Mtu, very small, with 2 feet least water, situated 1½ miles eastward of Mwezi, with Bunjuu about one mile farther east and uncovering 2 feet at low water springs.

One and a half miles north-east of Bunjuu is Mwamba Midira the most considerable reef hereabouts, with a surface composed of sand and coral slime that uncovers 6 to 8 feet in its centre. It is 1½ miles long, east and west, by one mile across, and shelves only to the north and north-east, where are several heads that block the passage between it and the Mpwa reef; farther north of this latter a short distance is the Mwamba Cha reef before mentioned, with a boat channel between.

Between Bunjuu and Midira reefs is a good broad entrance from the eastward to the Yimbo and Vanga anchorages, but the approach has not yet been surveyed. (*See* Directions, p. 109.) Eastward of Midira reef the barrier reef is broken in places, with a broad gap between Kisiti and Pungutiayu. Northward of this latter, close eastward of Pungutiachi island, and of Stork patch of 6 feet situated 3 cables E.N.E. of Ras Kisimga Mkono, the north-east point of Wasin island, is a passage leading northward to Wasin, with depths of 7 to 10 fathoms.

From this passage the barrier reef again trends north-eastward, with Lockyer patch of 9 feet, situated 1½ miles eastward of Wasin, and Ship shoals of 3 fathoms, 2½ miles in same direction; farther north the barrier shows on the edge of soundings, but not by dangerous heads, until the Wimbi reefs are reached off Sambweni, about 7 miles northward of Wasin.

DIRECTIONS.—Anchorage.—Wasin and Vanga from the eastward.—Mrima hill in line with Jombo hill, N.W. ¾ N. leads as far in as Ship shoals; when Ras Raschid is discernable, open Jombo northward of it, bearing N.W. ⅔ N., which leads in 5½ fathoms and just clear northward of Ship shoals; and when Ras Mundini bears W. ¾ N. steer W. by N. ½ N. northward of Stork patch, for the anchorage off Wasin.

To enter Wasin channel southward of Lockyer patch, bring Mrima to bear N.N.W. ½ W. westerly; on nearing Pungutiayu, Ras Kisimga Mkono will be seen just to the northward of it; proceed on this course until the whole of Kisiti island is shut in behind Pungutiachi east islet, bearing S.W. by W., when steer for Ras Raschid N. ½ E.,

See chart, No. 1,390.

until Ras Mundini bears W. ¾ N.; thence W. by N. ½ N. to the anchorage as before. pp. 403-416.

Anchorage in 7 fathoms with the town flagstaff at Wasin bearing S.W. is recommended, as during the south-west monsoon the swell is felt if anchored farther to the eastward. The reef fringing the shore must be guarded against.

Tides.—*See* page 104.

Proceeding thence south-westward for Vanga; from abreast Ras Mundini, in mid-channel, steer W. by N. ¾ N. for one mile, avoiding the patch of 3¾ fathoms, thence W. by S. for the south extreme of Sii island for 1¼ miles, or until Ras Mundini pillar bears E. ¾ S.; then S.W. by W. ¼ W., between Sii island reef and Howard rocks, until the south extreme of Sii island bears N. by W., when the vessel will be southward of Sii island reef, and may steer N.W. by W. ½ W. for the anchorage off Vanga. *See* Vanga town, page 105.

Anchorage.—There is anchorage off Vanga and the Yimbo river, in 6 fathoms, sand and shells, with the mouth of the Yimbo N.W. by W. ¾ W., and the west end of Sii island N.E. ¾ N.

Vanga and Wasin from south-eastward.—The only safe route at present to reach Vanga is through the Wasin channel, described above. There is evidently a passage southward of Mwamba Midira and the other reefs southward of Wasin island, but as these waters have only been partially surveyed, a safe passage must depend on a sharp look-out aloft, and the sun in a good position for seeing the reefs. H.M.S. *Stork* used this passage in the following manner:—From a position well seaward and northward of the South Head reefs, steer in with Ras Mkadini W. ¾ N. on with Kiluli summit, until Jombo hill is open westward of Sii island N. ½ W., when, at low water, the reefs will usually be seen; thence haul N.N.W. ¾ W. between Bunjuu and Midira reefs, until the west end of Sii bears N. ¾ E., then, if bound to Vanga, steer N. by W. ½ W. past Minyani reefs for the anchorage in 6 fathoms, sand and shells, with the mouth of the Yimbo river N.W. by W. ¾ W. and the west end of Sii N.E. ¾ N., as before stated.

See chart, No. 1,390.

pp. 403–416.

If bound to Wasin, when the west end of Sii island bears N. ¾ E., as before, steer for it until the clump of trees between Ras Kiromo and Mgomani bears N.E.; steer on this bearing until the south-west extreme of Sii island bears N.W. ½ N., when, to avoid its fringing reef, borrow a point to the eastward until the Wasin channel opens, when you will be northward of Howard rocks and may steer E. by N., approaching the northern shore until the north-east point of Wasin island bears E. by S. ¾ S., when steer in mid-channel until the anchorage off Wasin village is reached, avoiding the patch of 3¾ fathoms situated with Ras Mundini white pillar, the north-west extreme of Wasin island, bearing S.E. ½ E. about 8 cables. (*See* Anchorage, p. 108.)

If proceeding through Wasin channel to sea, keep in mid-channel until abreast Shungilanzi, when close Ras Wasin, to avoid the Stork patch, which will have been passed when Ras ya Waga bears northward of N. by E., or the whole of Pungutiayu island is open to the eastward of Pungutiachi islets. A course East will then take you northward of Ship shoals into deep water and into the strength of the current. A good mark for this channel and for clearing Stork patch, but requiring to be looked for from aloft, is the north end of Sii island, open northward of Ras Mundini W. ¾ N.

Ras Mundini open of Ras Wasin is also apparently a good mark for entering or leaving Wasin channel.

FUNZI BAY.—Ras Kanda.—At 4½ miles north-east of Ras Wasin is Ras Kanda, on which is a prominent clump of trees 126 feet high, which at first makes as an island: between, lies Funzi bay, mangrove-lined and reef-fringed with a sandy beach off the river Mamoja, and swamps in its north-west part between the above and the Uvinji river to the eastward of it; both of these rivers are unimportant. A large portion of the bay is taken up by the Mdua reefs, uncovering one to 2 feet at low water, and Mkame uncovering 3 feet, having a good channel between them which leads to a protected 4½-fathom anchorage, with sandy bottom north of Mdua reef; inshore of this latter is a sand cay that dries 3 feet.

There is also a 2-fathoms channel in the Vikuarani river to the small craft anchorage off Funzi village in the north-east part of the bay, but it is not recommended, as the space is very confined and the tidal streams run with considerable strength.

See chart, No. 1,390.

During flood tide there is considerable indraught into Funzi bay. pp. 403–416.

Funzi village contains about 150 inhabitants, the neighbourhood being sparsely cultivated and provisions obtainable in small quantities.

Directions.— Anchorage.—In Funzi bay a good anchorage will be found by steering in with Kiruki, open westward of some casuarina trees on the east side of Mamoja river, N.W. by N. northerly ; this leads in mid-channel between Mdua and Mkame reefs, the latter of which usually breaks. Bring up in 4 fathoms, sand, with the two conspicuous fir trees on Pungutiachi just open of Ras Raschid.

Gaze bay.—From Ras Kanda to Chale island, distant 9½ miles, the coast is rocky and reef-fringed, with the long beach of Sambweni midway, and Gaze bay formed by Chale island at the northern end. Amid the cocoanuts on the shore there are several small collections of huts inhabited by the people who formerly occupied Gaze at the mouth of the river of the same name at the head of the bay.

The WIMBI REEFS, the last sign of the barrier reef this side of Mombasa, are broken up into four, with depths of less than 6 feet, and shallow ground seaward of the two northern ; the passages between these reefs should not be taken, but inside them is a good channel along the land with a wide entrance from the northward between the Wimbi reefs and Chale island reef.

Chale island.—Anchorage.—Chale island, with its tree tops at an elevation of 60 feet, is a prominent feature hereabouts : the reef on which it stands stretches 2¼ miles southward of Chale point and dries 4 feet in places, with several heads of 3 and 4 fathoms off-lying it. Between this reef and the mainland is very good anchorage in 5 and 6 fathoms, mud, with Chale island east extreme about N.E. and a prominent clump of casuarina trees on the shore W. ¾ S.

Within Wimbi reefs.—Directions.—A vessel from the northward desiring to avoid the current, is recommended to take the passage south of Chale island reef, which brings her along the coast inside Wimbi reefs. To enter, when nearly 3 miles southward of Chale island, steer in with the summit of Jombo bearing W. by N. ¾ N., well open to the northward of a conspicuous clump of casuarina

pp. 403–416.

trees on the foreshore, until the clump on Ras Kanda bears S.W. ¾ S., when steer for it until the 322-feet thickly wooded coast range is abeam; then alter course to S.S.W. ¼ W. to clear the elbow of Sambweni reef.

COAST.—Reef.—From Chala point the coast, generally low, trends north-eastward nearly straight to Mombasa; it is wooded with overhanging cliffy coral points and sand beaches. For about 12 miles northward of Chala point it is fronted by a reef, extending from half to three-quarters of a mile from the shore, with a narrow passage for boats inside. From thence to Black Cliff point the reef fringes the shore at a distance of a quarter to half a mile.*

Black Cliff point, 16½ miles northward of Chala point, projects slightly, but is rendered conspicuous by its black cliffs and clump of pandanas, 108 feet in height, over them.

From Black Cliff point to Ras Muaka Singe entrance to Mombasa, the reef gradually extends from the shore, being one mile off at the latter point, where it is known as Andromache reef (page 117). There is a blind passage for boats inside the reef from the northward, to within one mile of Black Cliff point.

There are apparently no dangers outside the line of coast reef, which is steep-to, and may generally be seen by its breakers.

Current.—The current sets frequently in towards the land northward of Chala point. In January 1890, off Black Cliff point, it was found on one occasion setting W.N.W. at the rate of 1½ knots an hour. The usual current runs north-eastward, about one knot in the north-east monsoon period, and about 3 knots during the south-west monsoon.

Vessels, in the daytime, proceeding southward during the South-west monsoon period will avoid the strength of the current by keeping within half a mile of the edge of the reef, but a good look-out from aloft must be kept.

LANDMARKS.—Shimba range is a range of mountains 10 to 12 miles from the coast, and extending from 7 miles northward of Chala point for 15 miles, the highest point being 1,406 feet in height. On the southern shoulder of the range is a conspicuous tree, which is not visible, however, when bearing northward of West. On the northern shoulder of the Shimba range, at an elevation of 1,177 feet,

* *See* Admiralty chart, No. 664.

is a remarkable square clump of trees; a little northward of this clump there is a sharp fall, with a conspicuous gap (Mombasa gap) between it and a separate flat range to the northward 990 feet high. pp. 403–416.

There is a dip in the centre of the northern flat range, with a cluster of trees in it.

The hospital at Mombasa (white), built on the high ground above Ras Mitani, has been seen at a distance of 16 miles, and is a capital landmark.

Mombasa gap is seen open when bearing northward of West, and is a conspicuous mark for making Mombasa from northward and eastward.

Between Shimba range and the coast, 3 to 4 miles inland, is a range of hills about 400 feet high. On this range, 12 miles north of Chala point, and at an elevation of 368 feet, is a conspicuous square clump of trees; and $1\frac{3}{4}$ miles farther northward, another clump somewhat similar in appearance, but not so conspicuous.

At $3\frac{1}{2}$ miles north-westward of Black Cliff point, on the coast range, is a remarkable double bushy clump of trees 453 feet high; half a mile farther northward, on a separate summit 446 feet high, is a cluster of about 10 palms.

Coroa Mombasa.—The hummocks of Mombasa or Coroa Mombasa, are three low but remarkable hillocks situated 5 miles northward of the port of Mombasa, the centre, which has an elevation of about 450 feet, being the highest, the others being 365 feet; they are most remarkable when seen from the eastward, as they then appear close together; they are the best indication of the situation of Mombasa island, as the land near the sea (from 40 to 70 feet in height) is about the same height as the island itself, and the latter is consequently not easily distinguishable.

MOMBASA ISLAND* (native name Kisiwa Mvita) has the small harbour of port Tudor to the north, within it, the fine anchorages of Kilindini and port Reitz to the westward, and port Mombasa to the eastward. It is 3 miles in length, north and south, by 2 miles in breadth, having a level surface 40 to 60 feet in height, and a steep shore all round, perpendicular in places. Speaking generally, there is deep water close into it, except on the north and north-west sides, there being at the latter a ford to the mainland

* *See* plan of port Mombasa, No. 666.

pp. 403–416.

passable at low-water springs. This ferry and the road to the west is one of the ways of entering the interior from Mombasa.*

Owen justly compares this island to a huge castle encircled by a moat. It is tongued into a break in the coast between the rivers Doruma or Nash from the west, or Jumu or Barrette from the north and north-west, whence they discharge themselves into the sea. On either side of the entrance are the Andromache and Leven reefs, large outgrowths of coral reefs with off-lying shallows; but the channel in is straight, with not less than $5\frac{1}{2}$ fathoms water. The fairway is marked by two pillars in line.

The currents off the coast are the same as on page 112; the tidal streams at springs run strong, the ebb being at the rate of 3 knots through port Mombasa, and as much as four knots through Kilindini.

The winds experienced at Kilifi and at Mombasa for the latter part of 1888, were as follows:—

	S.W.	S.	S.E.	E.	N.E.	N.	N.W.	Calm or variable.
September ...	2	6	13	2	—	—	—	7
October	3	6	16	—	—	—	—	6
November ...	3	4	14	1	3	3	2	—
December ...	—	—	7	4	10	—	4	6

From the foregoing it will be seen that south-easterly breezes are very prevalent in these months, with a tendency to haul to the eastward and north-eastward in December. The wind sets in daily about 10 a.m., and lasts fresh till sundown, when it hauls to the northward, and moderates to a light land wind during the night and early morning; it is generally steadiest between 6 and 8 a.m., which is therefore a suitable time for going out under sail. The southerly monsoon blows right in the entrance. The day breezes of either monsoon lead in.

As at Wasin and Kilifi there is a considerable greater range of temperature than at Zanzibar, and thus these places are far more healthy in comparison.

The Town of Mombasa (native name Mvita), situated on the eastern coast of Mombasa island, is the most important town on the coast, being the head-quarters of trade and of the Imperial British East Africa Company.

* *See* plan of Port Mombasa, No. 666.

One of the most interesting features of the town is the old fort built by the Portuguese in 1594, and restored in 1635, which is at present occupied by a small native force in the service of the Company, and is also the residence of the principal medical officer. pp. 403–416.

Besides the fort, the two or three mosques form the most prominent objects in the town, but on approaching the port, attention is attracted by the fine new hospital for Europeans which has been erected on the ridge over Ras Mitani.

The town was formerly nothing but a cluster of Arab huts, but since the Company first commenced its operations, commodious offices and residences for the Company's officers have been built, the streets have been widened and improved, and sanitary measures are strictly enforced.

The house of the Administrator is situated at Ras Kilindini, on the west side of the island, from whence is a narrow railway to the town.

Mission stations.—Above Mombasa and on the opposite side of the harbour is Kisaoni or Freretown, the head-quarters of the Church Missionary Society, a group of buildings pleasantly situated amongst grooves of coco palms and mangroves. Eight miles north-west is the Rabai mission, on the wooded Rabai hills at Kisolutina, 3 miles back from the creek at the head of Mombasa harbour and 750 feet above the sea. The small Mission station of Jomvu is situated at the landing for Rabai, 9 miles by the creek from Mombasa; this route is the favourite way to the interior.

The population is estimated at from 15,000 to 20,000 and chiefly consists of Swahilis, but it also comprises a number of natives from the mainland, a few Arabs, and also natives from India; in the hands of the latter is the bulk of the wealth and trade of the place.

It does a large trade with Zanzibar on one hand, and Bombay on the other; the large dhows from the latter trading according to the monsoons, and bringing over rice, gampti (shirting), kaniki, ironware, and coloured cloths of various kinds.

The imports consist of white and grey shirtings, coloured handkerchiefs and scarves, printed cambrics, broadcloths, iron, brass, and copper wire, beads of different kinds, knives, ironware, arms, ammunition, kerosine oil, sheeting, drill, soap, salt fish and coffee.

See plan, No. 666.

pp. 403-416. The exports are ivory, india-rubber, gum (copal), cowhides, rhinoceros horns and hides, hippopotamus teeth, copral, orchilla weed, tortoiseshell, indian corn, matama ghee, cattle and goats.

The climate, although hotter than Zanzibar, is drier and less enervating, and with improved sanitation and increased cultivation of the soil around it, Mombasa will, it is expected, be one of the healthiest places in the Tropics.

Supplies.—The supply of food is drawn chiefly from the mainland, which is covered with flourishing gardens and plantations. Here are grown most kinds of fruit, vegetables and cereals in abundance; sesame, millet, maize and rice are largely cultivated, palms and mangoes flourish, as well as oranges, limes, pine-apples and guavas. Cattle, poultry and fresh bread can also be obtained. Water formerly could only be got from the well under Leven House (Mission) and from the well at Kisaoni, but possibly other wells have now been sunk to supply the town.

There is a hospital for Europeans over Ras Mitani, as before stated.

Wharves.—Mooring buoys.—A landing pier of iron, 26 yards in length, with a steam crane, has been constructed abreast the Custom House at about half a cable northward of the south-eastern Mosque.

On the opposite side of the harbour, at English point, is a store wharf with a steam crane for loading and discharging cargo from vessels visiting the port. The offices and workshops of the public works department are also situated on this point. There is a steam launch and a few iron lighters for assisting in the discharge of cargo. Moorings have been laid down in the harbour for the convenience of shipping.

Telegraph.—Railway.—Mombasa is connected with Zanzibar by submarine cable; thence, to other parts of the world. The cable is landed in port Kilindini, west side of Mombasa island. There is a land line to Malindi and Lamu; it crosses Mombasa harbour between Ras Kiberamini and Ras Kisaoni. The inauguration of the British East Africa Equatorial Railway took place at Mombasa on 26th August, 1890; about 7 miles were laid in that year, but nothing

See plan, No. 666.

seems to have been done since. The terminus is situated at Ras Mchangamwe on the north side of port Reitz, on the mainland. An air telephone wire crosses to Mombasa from abreast it. There is a narrow railway across the island from the town to the Administrator's house. pp. 403–416.

Mails.—The British India Company's and the German East Africa Company's (*see* p. 6) steamers call monthly.

The **observation spot** on Ras Kidomoni, opposite Mombasa town, is in lat. 4° 1′ 21″ S.; long. 39° 41′ 15″ E.

Aspect.—The entrance to port Mombasa is indicated by reference to the Coroa Mombasa (page 113), and from the southward by the hospital over Ras Mitani, and the fort with its flagstaff whose truck is 150 feet high. On nearing the land, the sandy beach south of the port indicates the position of Ras Muaka Singe; and 8 cables, north-north-eastward of it, on Ras Serani are the leading marks, black and white horizontally-striped pillars about 15 feet in height. Close eastward of the outer pillar is an old battery and a ruined keep; the battery has been whitewashed to give it prominence. Further assistance in picking up the position is rendered by a small ruined battery on Ras Mzrimli, 4 cables northward of Ras Muaka Singe; the ruin has been whitewashed.

Reefs in the approach.—Eastward of Ras Muaka Singe the Andromache reef extends for 4 cables, and patches of shoal ground on which there is less than 3 fathoms, for 5 cables beyond with deep water between. A rocky patch of $2\frac{1}{4}$ fathoms, three-quarters of a mile east of Ras Muaka Singe, must be kept in mind; there is always a heave on it. Ten feet water is marked in that direction, 9 cables from the point, on the old chart, but four several days searching at low water did not reveal it to H.M.S. *Stork*. Half a mile south-east of these are several patches with $3\frac{3}{4}$ fathoms, rock, two cables in extent; and $1\frac{5}{8}$ miles easterly of Ras Muaka Singe, and half a cable south of the leading mark, is a 5-fathom small head of rock. A patch of 4 fathoms is situated $1\frac{1}{2}$ cables northward of the leading mark, about $2\frac{1}{4}$ cables from the 5-fathom head; *see* the plan for other possible dangers.

On the northern side of the entrance are the Leven reefs, which are not so steep-to as the Andromache, the 5-fathom line lying more than three cables off the western portion of their edge and 8 cables south-west of the outer or eastern edge of that reef. Within the

See plan, No. 666.

pp. 403–416. reef is a sandy beach with George rock (12 feet) at the inner and western end, and the small bluff of Ras Kunwongbe, 70 feet in height, at the other. Thence the coast trends north-easterly for 3 miles to Ras Iwa Tine, composed of sandy beaches and a narrow fringing reef with a dhow and boat channel inside the Leven reefs, which latter trends parallel to the coast, and with its inner edge 5 to 3 cables distant.

The outer anchorage is in about 10 fathoms, sand and coral, with Ras Iwa Tine just open of Ras Kunwongbe N.E., and the outer leading mark pillar N.W. by W. ½ W. It is very indifferent, there being always a heave which, during the south-west monsoon, is considerable.

Between Ras Muaka Singe and Mzimili is the entrance to the port Kilindini and port Reitz. (Referred to on p. 121.)

PORT MOMBASA is an inlet 2 cables in width and one mile in length on the east side of the island, and with good anchoring depths in most places close to the shore, and depths of not less than 5 fathoms in the fairway of the approach. Off Ras Serani the fringing reef is not steep-to and should be given a berth of three-quarters of a cable; the coast is cliffy and trends northward from Ras Serani past Ras Mitani to the fort and town, where, abreast the Mosque, and the Custom House, it forms a small point, the foul ground off which must be avoided. Hence it trends away north-west and thence forms with Ras Kiberamini three-quarters of a mile to the northward, a bight half filled with reef and useless for anchorage purposes.

On the other side of the inlet, Mackenzie point, 3 cables W.N.W. of George rock, is 25 feet in height, the reef and shallow water extending out into the channel from both, and narrowing the entrance channel, which is close over to Ras Serani, to one cable in width between the 5-fathom lines. Half a mile above Mackenzie point is Ras Kidomoni or English point (the Observation spot), 10 feet high at the point, and rapidly rising behind to 40 feet. There is bold water close into the point. Thence extend cliffs 40 feet high for three-quarters of a mile to the pool at the head of the anchorage—north of which lies Kisaoni, the Mission station before referred to.

A small coral spit extends about half a cable south-eastward from below Kisaoni flagstaff.

See plan, No. 666.

Beacons.—On Ras Serani are two beacons, painted black and white in horizontal stripes, about 15 feet in height; these in line mark the fairway from seaward. On Ras Kiberamini, within the harbour, is a black and white horizontally-striped stone pillar 15 feet high, one of the marks for leading up the channel. pp. 403-416.

Anchorage.—There is good anchorage off the town in 7 fathoms, sand and shells, just to the westward of the leading mark, and with English point N.E.; also in 10 to 12 fathoms in the pool off the Kisaoni Mission Station, but in either place vessels are recommended to moor. The holding ground is good but the tides are strong, especially the ebb; and when the sea breeze sets in strong, vessels swing broadside on between wind and tide, which occasionally brings a heavy jerk on the cable. Strangers should come in on the ebb and large vessels at high-water, or the first of the ebb.

A rifle range has been established by H.M.S. *Conquest*, at English point, 600 yards range.

Tides.—It is high water, full and change, at 4h.; springs rise 11 feet, neaps 8½ feet. The ebb and flood are about equal, and run at the rate of about 2½ knots at springs.

Directions for Mombasa.—A vessel from the southward should skirt the Andromache reef at about a mile, and if of heavy draught should make towards the outer edge of the Leven reef until she brings the pillars on Ras Serani in line N.W. ⅜ W., to avoid the 5-fathom patch, situated half a cable southward of the leading mark, when she may proceed in on that bearing. These pillars are not always made out without the aid of a glass; in the forenoon they are distinct and have been seen 5 miles, but they are shaded in the afternoon; the whitewashed battery on the point just eastward of them best denotes their positions.

A vessel from the eastward should bring the flagstaff on the fort N.W. ½ N. until the pillars can be seen; and, if from the northward, skirt the Leven reefs at half a mile distance, but should not haul round until the flagstaff or pillars be brought on the above bearings, when proceed in as before.

The tidal streams meet off Ras Serani, requiring at springs the greatest attention to be paid to the steering, especially going in on the ebb, when the race will take the vessel first on one bow and then

See plan, No. 666.

pp. 403–416.

on the other. When Ras Iwa Tine is about to be shut in by Ras Kunwongbe, look out to pick up the flagstaff* at the west end of the Mission Station at Kisaoni, and alter course in good time to bring it in line with the pillar on Kiberamini, bearing N. ½ W., which mark leads in the fairway of the entrance (only one cable wide between the 5-fathom lines at low water), and up towards the anchorage.

When nearing Ras Mitani a vessel should borrow to the eastward of the mark as the channel then becomes wider and to avoid the reef projecting there, and also higher up off the town on to which there is a decided set, and at times a small tidal race. Anchor as before directed if there is a berth, p. 119, but if necessary to go farther on a vessel should endeavour to anchor below the rock, which dries 11 feet on the western flats, off which the water is from 16 to 18 fathoms in depth.

Port Tudor.—From the head of port Mombasa a narrow and winding but deep channel communicates with port Tudor, a fine land-locked harbour on the north side of the island. There are few more beautiful places than this winding channel with its steep wooded banks, but the passage is impracticable for a sailing ship on account of its windings, but quite easy for a steamer keeping in mid-channel. The two points on the eastern side of the passage Ras Kisaoni and Junda are fringed with reef or foul ground to the distance of half a cable; after passing these, when entering port Tudor, a berth increasing to 1½ cables must be given to Kwamwana Ina, the north extreme of Mombasa island, to avoid the reef extending nearly that distance from it. Vessels cannot proceed above the telegraph (air) line across the harbour abreast Ras Kisaoni.

The anchorage is in 7 fathoms, mud, in its eastern part with Makame Jiwe Ras, just open of Ras Junda, and the points of Makupa channel to the south-west (a boat channel leading to port Reitz) just beginning to open. The remainder of the harbour is spoiled by the extensive flats that limit the anchorage ground. There are several channels through these flats, that to the north leading to the Jumvu river, which at high water may be ascended for several miles and towards the head of which is the large Mission Settlement of Rabai.

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* This flagstaff, or a mark in lieu, has two white cones some feet apart on it (sketch in Remark Book of Lieut. E. Kiddle, H.M.S. *Swallow*, 1893).

See plan, No. 666.

KILINDINI AND PORT REITZ.—**Kilindini,** which means "in the deeps" is the name given to the fine sheltered harbour about 3 miles in length, situated on the south-west side of Mombasa island; it is available for all classes of vessels. Within it and to the west of the island is an equally good anchorage in 7 to 14 fathoms, over one mile in length, with less depths farther in, in the eastern part of port Reitz; its western part, like port Tudor, is composed of flats and shallow water except in the small channel to the Doruma river. pp. 403–416.

The entrance is about $1\frac{1}{2}$ cables wide increasing to 7 cables in port Kilindini, but the latter is encroached upon by Buchanan rock, awash at low water, and the Kilindini reefs, about 2 cables in extent, which dry at low water springs. It sweeps gradually round from a south-west to a north-west direction, the banks on either side being high, part bush and tree covered and part cultivated, with a small but shallow inlet on either side, Mbaraki to the north and Mueza to the south.

Directions.—Beacons.—The entrance is well marked with two whitewashed leading pillars 12 feet high, on the south bank, which (having come in from seaward with the leading mark pillars on Ras Serani in line N.W. $\frac{3}{8}$ W. as for Mombasa, p. 119) should be steered for when in line, bearing S.W. by W. $\frac{7}{8}$ W.

When abreast of Ras Muaka Singe, Ras Bofu one mile farther up on the south bank will be seen to open of Ras Mbuyuni, the point on the north side within Mzimili, when alter course towards it and keep mid-channel until the 12 feet beacon on the rock 6 feet high, opposite Ras Kilindini is seen, when steer for it on a N.W. $\frac{1}{4}$ N. bearing,* which leads northward of Buchanan and Kilindini reefs; when Shamanzi the north-western point of Mombasa island is well open of Ras Kilindini, alter course to the northward keeping in mid-channel until abreast Ras Kilindini, thence rather towards Mombasa island into port Rietz.

Anchorage.—There is anchorage in port Reitz (Banderia Kipevu) in 12 to 15 fathoms, mud, with Ras Kigangone S.E. by E. 4 cables distant. A vessel anchoring in port Kilindini for the night, or for shelter, will find a good berth in 12 fathoms, mud, off Mbaraki creek, a much preferable anchorage to lying in Mombasa outer anchorage.

*Another beacon has been placed on the shore, on the same line of bearing, but it is too close to the other to be of much use as a leading mark. H.M.S. *Racoon*, 1891. *See* plan, No. 666.

pp. 403–416. Eleven British men of war anchored in port Reitz in February 1890.

Telegraph cable.—The submarine cable is landed at the red cliff, southward of Ras Kilindini; at the bend it is marked by a red buoy with staff and ball in 6 fathoms. The telegraph house is near the summit of the cliff. The cable ship is moored off Luatoni bay but out of the fairway.

The residence of the Administrator of Mombasa is situated on Ras Kilindini, from whence is a narrow railway to Mombasa town as before stated.

COAST.—From Mombasa to Kilifi the coast trends north-eastward with sand beaches and overhanging cliffy coral points, and is thickly wooded as far as Malindi. It is fronted by a reef extending from half to three-quarters of a mile from the shore, to a distance of 12 miles north of Matapwa river, with a passage for canoes within. That portion between Mombasa and Matapwa is known as the Leven reefs, before mentioned. From 12 miles north of Matapwa to point Senawe, the coast is steep-to, with overhanging coral cliffs about 15 feet high. On the top of this cliff, and 15 miles north of Matapwa is a conspicuous white sand patch.*

There appears to be no lying-off dangers until the reefs off Kilifi are reached. The coast reef is steep-to and nearly always breaks.

Current.—The current runs strongly to the northward off the coast; but is less in shore near the reef.

Matapwa river.—There is a passage through the reef to the entrance of the Matapwa river, and at least a depth of 3½ fathoms can be carried into the river in which there is deep water, but the channel is rather intricate. Were the river to be made use of at any time, a more thorough examination would be required.

The land telegraph wire crosses the river at the ferry, about 2 miles up.

Rabai range, about 8 miles from the coast, has five distinct summits, the northern 1,087 feet, being the highest. Near the southern summit is the Mission station, p. 115. Between Rabai range and the coast the country is undulating and wooded. The Coroa Mombasa, seaward of the Rabai, is described on p. 113.

* *See* Admiralty chart, No. 664.

Senawe range.—North of the Rabai range, and separated from it by a low hill, is the Senawe range, the southern peak of which is 1,152 feet high, and rendered conspicuous by a group of tall palms on its summit. Between the northern peak, 1,025 feet, and a hill 978 feet in height, is Kilifi gap. pp. 403-416.

Coast range.—Three to four miles north of Matapwa, a coast range commences which is 400 to 500 feet high, with thickly wooded country between it and the coast. At the south end are two peaks, the southern 509 feet high, may be recognised by a bushy clump of trees on its summit. Farther along the range, on another peak is a round clump of trees, also conspicuous; and on the northern slope there are three conspicuous single trees. The coast range ceases at about 3 miles southward of Takaungu.

TAKAUNGU RIVER.*—Between Blowing point and the Takaungu river one mile northward of it, the coast is bluff, and some 40 to 50 feet high, with a bright sandy beach 2 cables long (one of the recognising features), just south of the entrance to the river. The latter is half a cable wide and runs at high water between rocky bluffs, but at low water the bed is confined to a narrow channel at the side of the northern bluff, all the rest of the bed uncovering. At low water springs the *Stork's* steam cutter entered with much difficulty—the bottom being rocky with several projecting heads. It is navigated by the dhows at near high water; but the tidal streams run swiftly, and there is considerable bubble and disturbance between the entrance and the town. After winding some 1½ miles inland it is lost in large mangrove swamps.

Takaungu, a large and walled town, is situated in a grove of cocoa-nuts on the south bank half a mile from the entrance, and is the principal town on the coast between Mombasa and Malindi. It boasts a fort in charge of an Akhida (Captain) and 30 soldiers, and a varying population of 1,500 to 2,000. It has several mosques and some 300 to 400 houses and huts, with numerous wells, and is a thriving place. The surrounding country is well cultivated, there being a large number of farms in the neighbourhood, whence much grain is raised and exported.

Trade.—Supplies.—Meat is obtainable here, and fowls, eggs, and

* *See* Admiralty plan of Kilifi river, No. 238.

pp. 403–416.

vegetables are abundant. There are several Indian traders, but it is not such a centre for copra, hides, and ivory as Mombasa. There is a ferry across the river to the main coast road that leads to the northward.

Mbogolo hill, 250 feet high, rises out of the plain, some 2 miles south-west of the town, and is quoin-shaped, with the fall to the northward : this shoulder, on with the southern side of the bluff near the river entrance, forms a fine mark for leading through the Takaungu pass in the reefs.

KILIFI APPROACH.—From pinnacle point on the north side of the Takaungu river, to Ras Kitoka, the coast trends northerly for 2 miles to the mouth of Kilifi river : it is rock-bound and reef-fringed, the cliffs being between 40 and 60 feet high, with two small sandy beaches in its southern part, and the leading mark pillar 14 feet high, rather more than half way along, standing on the top of the cliffs 44 feet above high water. W. by N. distant 1½ cables from the pillar, is a whitewashed limb-lopped baobab tree, with pole and triangle. These marks soon become covered up by the growth of vegetation ; they were cleared by H.M.S. *Blanche* in 1893.

Ras Kitoka, 57 feet in height, forms the southern side of the mouth of the Kilifi river, the northern side being an abrupt rise to the same height and then a continued but gradual rise at the back, on which is situated the small village of Kioni. In front of the eastern huts of the village is a white stone pillar 15 feet in height and standing 70 feet above high water ; this pillar in line with the trunk of a large whitewashed cotton tree below, whose top and limbs have been lopped off, leads up between the reefs from the roadstead to the mouth of the river.

KILIFI RIVER,* with 15 and 30 fathoms in mid-channel, is sinuous, one and a half miles in length and one and a half cables wide, leading to a large basin of Bandaria ya Wali. It lies between cliffs 70 to 100 feet high which have a small fringing reef to them, of slight extent everywhere except a spit that extends one cable northward from Ras Kitoka on the south side, and another one from the north side near the custom house, and the ferry which plies across from the sandy beach close under and west of Ras Kitoka, near

* Remarks amended from H.M.S. *Blanche*, 1893.
See plan, No. 238.

which beach is situated the village of Kilifi of about 70 inhabitants (fishermen and ferrymen), and a small dhow building yard. pp. 403–416.

Mnarani, the principal village, is on the table land above a small plain one mile from the entrance and on the southern side of the river just before its last bend. It has a scattered population of 300 people, mostly engaged in agriculture, from whom small supplies of fowls and vegetables and an occasional bullock can be obtained. The old town of Kilifi, the ruins of whose mosques are still visible was situated above and to the westward of the plain.

Whilst this district has come to be referred to by Europeans as Kilifi because of the anchorage afforded by that river and its inner basin, it is more readily known to the natives as that of Takaungu.

Anchorage.—There is good anchorage in the river, for craft that can pass under the telegraph wires, off the plain in 12 fathoms, mud, with the Custom house point well open of the southern side of the river E. by S., and the western side of the plain under Mnarani S. $\frac{1}{2}$ W. The wire is somewhat more than 80 feet above high water near the northern shore. H.M.S. *Blanche*, masthead 80 feet high, passed under it at high water. The least height from the water is 68 feet at high water springs. Vessels with higher masts must anchor in the middle of the channel, in 15 to 20 fathoms below the wire, and where the anchorage probably is equally good.

Telegraph.—The air line, between Mombasa and Lamu, *viâ* Malindi, crosses Kilifi harbour close westward of Mnanari village.

Banderia ya Wali is $1\frac{1}{2}$ miles across with good anchorage in 9 fathoms, mud, in its eastern part, with Ras Ncoma S.E. and Ras ya Wali S.W. The foreshores are reef and mangrove lined, and rise gradually on all sides. The northern and western sides of this fine basin are completely choked with reefs and mud flats. In its north-western part is the populous village of Kibokoni on the northern bank of the mouth of the Mtanganyiko or Konjoro, a narrow river, with one foot water in its entrance but deep within. This river bifurcates some 2 miles up, and leads to the grain-growing centres of the same names, Konjoro to the northward one mile, and Mtanganyiko the same distance to the west.

Reefs in the approach.—The off-lying reefs named South, Middle, and North are nowhere dry, but a few heads are occasionally

See plan, No. 238.

pp. 403–416. visible at low water springs on the Middle reef. In the N.E. monsoon (and especially at high water) they are not nearly so prominent as during the S.W. monsoon, when they always break, and at times to such an extent after heavy weather that no signs are visible of the channels between them.

Passages.—There are three passages between the reefs, namely: the Dhow passage between Blowing point and the Southern reef, to which the white pillar at entrance to Kilifi river in line with the outer leading mark Pillar southward of it leads; this is a lumpy channel but used by dhows and light-draught vessels.

The Takaungu pass, one and one-third cables wide between the Southern and Middle reefs, the leading mark for which is Mbogolo hill shoulder tip W. by S. ½ S. in line with the bluff on the southern side of the Takaungu river; this pass carries 15 fathoms until within the reefs.

The Northern pass, one mile northward of the Takaungu pass, leads direct on to the coast and has a depth of 7 fathoms, but is only half a cable broad; leading mark pillar and whitewashed tree in line bearing W. by N. lead through.

The North reef is continuous past the mouth of the Kilifi river, but breaks up to the northward; within it is another series of reefs which much hamper the approach to the Kilifi river, leaving a channel only one cable wide, through which the whitewashed tree N. by W. ⅞ W. on with the white pillar, leads. Attention must be paid to the set of the tidal streams in taking this channel: the flood setting northerly across the reefs until well up to the river mouth; and the ebb setting straight out across the reefs.

Tides.—It is high water, full and change, at 4h., springs rise 12 feet, neaps 8 feet.

DIRECTIONS.—Takaungu pass.—Steer in with the summit of Mbogolo hill, in line with the bluff on the south side of Takaungu river W. by S. ½ S., until the white stone pillar is well open westward of the whitewashed tree below it, when alter course to starboard, either for the anchorage in 6 fathoms, sand, with Pinnacle point W.S.W. and the leading pillar for North pass N. by W. ¼ W.; or for the northern end of the roadstead.

See plan, No. 238.

For the Northern pass bring the leading mark pillars and whitewashed tree behind it in line bearing W. by N. and steer for them. pp. 403–416.

When within the reefs, anchorage will be found in 9 fathoms, sand, with the Northern pass pillar W. ¼ N. and Ras Kitoka N.W. ½ N.; but there is always a considerable ground swell in this outer anchorage.

To proceed into the river, from the anchorages above mentioned, a small ship may keep the white stone pillar on with the whitewashed tree N. by W. ⅞ W.; but a large vessel should, after passing the leading marks for the Northern pass, borrow slightly to the land side of that leading mark, until she is half-way to Ras Kitoka, to avoid the south-west corner of the inner North reef; and then borrow slightly on the other side of the line to avoid the foul ground extending eastward of Ras Kitoka. When Ras Ncoma comes in line with the point eastward of it on the northern side of the river, haul into the river, in mid-channel; Ras Ncoma open of the point on the northern side, leads southward of the reef off the Custom-house point under Kioni. Anchor off Mnarani, or in Banderia ya Wali, as convenient. *See* p. 125.

Caution.—In taking these passes or channels great care must be taken of the tidal streams, which set directly across the passes and obliquely across the channel, flood to northward and ebb to south-eastward and south.

COAST.—From Kilifi to Owyombo the coast trends northward with similar sand beaches, and overhanging coral cliffs, as to the southward, and is fringed with a reef to a distance of half to three-quarters of a mile from shore. The coast is lined with thick scrub and bushes 15 to 20 feet high.

Sand patch and clump.—About mid-way between Kilifi and Owyombo there is a very conspicuous sand patch with a high clump of casuarina trees over it. This is a very good mark, and shows conspicuously from both north and south. Between it and the village of Wasa, to the southward, there are some red sand cliffs.

White Sand hill.—Just south of the Owyombo river, and on the coast, is a conspicuous white sand hill 25 feet high, and at the

See plan, No. 238.

pp. 403–416.

mouth of the river on the south bank is a remarkable hummock 131 feet high, steep on its southern side, but sloping on its northern.

Owyombo river is of no practical use for navigation, except for canoes. Dhows, however, anchor inside the island at the entrance.

In the centre of the entrance to the Owyombo there is an island 45 feet high. On the northern bank of the river entrance there are patches of red sand cliff.

Hills.—Between Kilifi and Owyombo, and about 5 miles from the coast, there is a range of hills 600 to 800 feet high, but flat and without any defined summit.

Mangea mountain is 1,776 feet in height, and situated 15 to 20 miles from the coast; it has a fairly well defined summit, the sides sloping gradually, and standing alone it makes a good land mark for the coast, should the weather be clear enough for it to be seen.

COAST.—From the Owyombo the coast trends east-north-eastward to Malindi point, fronted by a coral reef, which gradually extends from the shore southward of the cape.

Islets.—Landmarks.—Three miles northward of the Owyombo are six islets, 50 to 100 feet high, and close to the shore; these are backed by a sand beach, which gives them the appearance of being cliffy points. The village of Watamu lies behind them. Off these islands the bottom is rocky and uneven for a distance of one mile.

Just south of Malindi point are two long sand beaches, which are conspicuous by the double black coral points which separate them.

MALINDI APPROACHES.*—Malindi point or cape is a cliffy, coral, rounded point, 20 feet high, but is rendered noticeable by the Sail rock just off it.

Sail rock is 21 feet high, and resembles a sail when seen clear of the point. This rock was whitewashed by H.M.S. *Stork* in November 1889.

Malindi reef, off Malindi point, extends to a distance of 1½ miles from the shore; it dries about 3 feet in places and generally breaks. There is a good passage within the reef, used by the dhows.

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* *See* Admiralty chart, No. 664, and port Malindi and approaches, No. 667. Add chart, No. 848, Malindi to Juba, to index chart.

Malindi bank extends from 4 miles east, to 7 to 8 miles south of Malindi point, with depths of 4 to 8 fathoms. It is steep-to on its outer edge, gradually deepening to the southward. There are apparently no shallower heads, and the bottom of sand and coral can be easily seen up to a depth of 8 fathoms. There are heavy tide rips and overfalls at its edge. pp. 403–416.

Coast.—From Malindi point to Leopard point the coast is cliffy and wooded, 15 to 20 feet high. There is an off-lying rock 12 feet high, half a mile south of Leopard point, but is not easily distinguished till close in.

Leopard point is a white sandy point, with a very conspicuous clump of casuarina trees within it.

Quoin hill, a wooded hill about 200 feet high, and 8 miles west-north-west from Leopard point, shows conspicuously from the eastward.

Coast.—Between Leopard point and Vasco da Gama's pillar there is a long stretch of sand beach, fronted by a reef, which dries in places, extending half to three-quarters of a mile from the shore.

Vasco da Gama's pillar, in lat. 3° 13′ 21″ S., and long. 40°08″00″ E., is near the extremity of the point, which is of coral, cliffy, perforated in two places, and situated southward of Malindi town. The pillar is 18½ feet high, having a cross with the arms of Portugal on the top (very much weatherworn), 25 feet above high water mark. The pillar was re-whitewashed by H.M.S. *Stork* in November 1889. There is a small cove westward of the pillar, open to northerly winds.

North reef, lies from a half to one mile off Leopard point, and gives shelter from northerly winds to Malindi road. It has a white sand cay on it which dries 10 feet.

Pillar reef is an extensive coral reef fronting the coast between Malindi road and Malindi town. Off Vasco da Gama's pillar it extends to the distance of one mile, and nearly always breaks on its northern and eastern edges.

Leopard reef, which protects Malindi road to the eastward, is a reef about 2 miles in length, by half a mile in width at its broadest

See plan, No. 667.

pp. 403–416.

part, and dry in places at low water; its outer edge being $2\frac{1}{2}$ miles from the shore. On its inner edge is a sand cay which is awash at high water spring tides.

MALINDI ROAD is an anchorage between Malindi and Leopard points, with depths of from 4 to 7 fathoms. It is protected from northerly and easterly winds by North and Leopard reefs respectively.

A coral patch, awash at low water springs, lies on east side of Malindi road, 4 cables southward of North reef, with Leopard point bearing N.W. by N. one mile.

Directions.—To enter Malindi road from the southward, steer in with the conspicuous clump of casuarina trees on Leopard point, in line with the summit of Single Tree hill N. $\frac{7}{8}$ W. This will lead in with not less than $3\frac{1}{2}$ fathoms over Malindi bank. When Sail rock shows clear of Malindi point, bearing S.W. $\frac{1}{3}$ W., keep it astern on that bearing, and anchor in $6\frac{1}{2}$ fathoms, sand and coral, when the clump of casuarinas within Leopard point bears N.W. by N.

Stork passage, the northern entrance to Malindi road, between North reef and Leopard reef, is 3 to 4 cables wide, and apparently clear of danger. North reef is generally easily seen, and the passage can be used by keeping from one to $1\frac{1}{2}$ cables eastward of it.

Griffon patches.—Shoal water in patches extends from one mile eastward of the sand cay on Leopard reef for a distance of 3 miles to the northward, with depths of 3, 4, and 6 fathoms coral. These shoals include the Griffon patches. Single Tree hill, in line with the guardhouse on the north bank of the Sabaki river, N.N.W. $\frac{2}{3}$ W., leads northward of these patches.

MALINDI, situated 3 miles northward of Malindi road, derives its chief title to notice from the first voyage of Vasco da Gama, who reached as far north as this place on his way to India in 1498. He describes the town as standing on a plain, near the coast, surrounded with gardens, and consisting of houses neatly built of hewn stone, with handsome rooms and painted ceilings. It was at that time evidently a place of some importance. In 1605 the Portuguese, under Don Francisco d'Almeyde, took possession of the place. In the beginning of the last century it was in possession of the Arabs, but

See plan, No. 667.

when Captain Vidal visited the place in 1824, he found that the territories of the ancient Kingdom of Malindi were totally occupied by the Galla, a savage nation, which carried its conquests from the southern declivity of the Abyssinian Alps as far south as Malindi. On the site of the town Captain Vidal found nothing but ruins, and his opinion was that it was entirely destroyed by the Galla in their wars with the Arabs, who possessed most of the ports along this part of the coast. pp. 403-416.

The town is now under the control of the Imperial British East Africa Company, who collect the customs and administer the government. The house of the agent, a two-storied whitewashed house, faces the sea, the Company's flag being generally hoisted on a flagstaff on the roof. There are now several other fair-sized houses. Trade is increasing.

Supplies.—Trade.—The town possesses a good supply of water from deep wells, and provisions are abundant. About 54 inches of rain falls during the year, and in the wet season the aspect of the country is most luxuriant. Sesame is the largest and most valuable product, and is exported to Aden and Maskat.

Telegraph.—Malindi is connected with Mombasa by a land line of telegraph. *See* Mails, p. 6, German Line.

Landing.—There is no landing pier. At low water it is necessary to wade or be carried on shore from the boat. At high water, if it is smooth, landing may be effected by a gangway board.

Observation spot.—The flag-staff of the British East Africa Company, the observation spot of H.M.S. *Stork*, is in lat. 3° 13′ 0″ S., long. 40° 7′ 41″ E.

Patch.—A patch, with one fathom least water, on its north end, lies N. by E. 1½ miles from Vasco da Gama's pillar; it breaks occasionally, but not unless there is a good deal of swell.

Tides.—It is high water, full and change, at Malindi at 4h. 5m., spring rises 12½ feet, neaps 9 feet.

Directions.—Anchorage.—Approaching from the southward, Mangea mountain forms a good landmark for making the coast about Malindi. On a nearer approach the most conspicuous mark will be the white sand hill north of Sabaki river. The white two-storied house of the British East Africa Company will then be seen

See plan, No. 667.

pp. 408–416.

with Vasco da Gama's pillar to the southward of it. A good berth having been given to Leopard reef, a vessel will be northward of Griffin patches when Vasco da Gama's pillar bears westward of W. by N., when course may be shaped to pass one mile northward of the pillar ; the Company's flagstaff may be steered for between the bearings of S.W. by W. and S.W.

A good anchorage in about 5 fathoms, sand and coral, will be found with the Company's flagstaff S.W. by S., and Vasco da Gama's pillar in line with the clump of casuarinas on Leopard point, bearing S. $\frac{1}{3}$ W., and conspicuous bluff N.N.W. $\frac{1}{2}$ W.

The anchorage is protected to the southward by Pillar band, and affords good shelter during the south-west monsoon period, though some swell sets in. The depths decrease gradually, but it is not recommended to go into less than 5 fathoms on account of the swell.

Approaching from northward, after passing Ras Gomani, the hills over Mambrui will be seen ; then the conspicuous white sand hill north of the Sabaki river. The Company's flagstaff bearing westward of S.W. $\frac{1}{2}$ S. leads eastward of one-fathom patch ; when anchor as before recommended.

Supplies.—Supplies of beef, vegetables, fish, fowls and eggs, can be obtained at reasonable prices. There is a market near the centre of the town. There are wells of great depth and of ancient construction, but after a dry season water is scarce.

Current.—In the months of November and December off Malindi, outside the reefs and within the 100-fathom line, a nearly constant current setting to the southward was found, running at a rate of three-quarters of a knot an hour. Outside the 100-fathom line, the current sets to the northward from one to 3 knots an hour all the year round.

COAST.—Between Malindi and the Sabaki river there is a long stretch of sand beach, backed by a low range of sand hills.

Conspicuous cliff.—N. by W. $1\frac{3}{4}$ miles from Vasco da Gama's pillar there is a conspicuous dark bluff 25 feet high, which shows well between the sand beaches on either side.

Sabaki river, situated south of Mambrui point, is shallow, and of no use except for canoes. At low water it dries across the mouth,

See plan, No. 667.

which is quite blocked by rocks. The discharge from the river was only checked near the mouth by the flood tide. pp. 403-416.

Mambrui point.—From a short distance north of the Sabaki river the land rises to a coast range, forming Mambrui point. Near the south end of the range is a conspicuous white sand hill, 145 feet high. It shows well from the south and eastward, and from the northward it is easily distinguished as soon as it opens of Mambrui point.

A reef which generally breaks extends a mile or more off the point.

Mambrui is situated on the north side of Mambrui point and 6 miles north of Malindi. There is a conspicuous house and bushy tree near the centre of the town.

Coast.—From Mambrui to Ras Ngomeni peninsula the coast is sandy with low sand hills and bushes. The country is flat between the coast and Single Tree hill.

Reefs extend from one to 1½ miles off the shore of the bay between Mambrui and Ras Ngomeni.

Anchorage.—Southward of Ras Ngomeni summit, and within an isolated reef, good anchorage will be found in 5 to 6 fathoms, sand. The entrance between the reefs is 2 cables wide.

Directions.—To enter, steer in with the summit of the peninsula of Ras Ngomeni bearing N. by W. ½ W. until the east extreme of the point bears N.E. by E. ½ E., then haul up on that bearing and anchor as convenient. H.M.S. *Stork* anchored there in smooth water when there was considerable swell outside.

Single Tree hill is a round topped hill 569 feet high, situated 7 miles north-westward of Mambrui point. It has a clump of trees on its summit, and is conspicuous from the southward. It forms, with Leopard point clump, the leading mark for entering Malindi road, and in line with the house on the north bank of the Sabaki river clears the Griffon patches and dangers northward of Leopard reef.

See chart, Malindi to Juba, No. 848.

RAS NGOMENI TO LAMU.

pp. 416–418. **FORMOSA BAY*** lies between Ras Ngomeni and Ras Shaka. The only dangers to navigation in the bay are the Zeboma or Pamamba reefs and shoals in the southern and the Mwamba Zewoyu or Ozi reefs in the northern part. The remainder is clear, and may be anchored in anywhere. The rivers Kalifi, Tana, and Ozi enter the sea in Formosa bay, and there are several large salt water creeks in the southern part. The country immediately behind the coast is flat and covered with mkoma palm woods and prickly acacia jungle, with large open spaces apparently under water when the rivers are in flood. Between Ngomeni and Kipini the coast tract is uninhabited during the greater part of the year. Fresh water may be obtained by digging close to the coast almost anywhere.

Ras Ngomeni is a bold projecting peninsula of overhanging coral cliffs about 15 feet high, with low scrub covered hills behind. An isolated hill 80 feet high stands one-third of a mile from the extreme. A ridge runs to the westward for some 2 miles along the peninsula, and a conspicuous summit, 160 feet high, with two white sand slopes on the northern face, rises from the head of a small bay about 2 miles to the westward of the point.

The Coast.—The rocky coastline which forms the point suddenly turns to the westward from Ras Ngomeni and gives place to sand beach. After forming a small bay it trends northward for 15 miles to the mouth of Kalifi river, the low sandy shore being studded with clumps of mangroves and casuarinas, and backed by salt water creeks and swamps.

Northward of the Kalifi river mouth the coast consists of sand hills, and inclines gradually to the eastward to the mouth of the Ozi.

The river Tana enters the sea 6½ miles from the Kalifi, forcing its way through the sand. Seven miles to the northward of the Tana mouth the coast sand hills become much higher, and continue so to the mouth of the Ozi river. Thence the direction of the coast is E.S.E. for 5½ miles, consisting of low red cliffs and sandy beaches, backed by ridges thickly covered with mkoma palms, to Ras Shaka, the northern extreme of Formosa bay.

* The survey and remarks on the coast of Formosa bay and to Lamu harbour are by Lieutenant Smyth, H.M. surveying vessel *Stork*, 1892. *See* chart, No. 848, and plans on No. 1,747. This information on Formosa bay cancels from line 25, page 416, to line 6 from bottom of page 418.

Aspect.—Single Tree and Flat hills, situated 11 miles to the south-westward from Ras Ngomeni, can generally be made out, and on a clear day a distant table land without feature may be distinguished stretching away inland, but the only objects on the coast which will be sighted between Ngomeni and Shaka are the high mangrove summits behind Ras Kitua, 10 miles from Ras Ngomeni, the hills near the mouth of the Tana, the Kitanga Tangani sand hills, and the hills behind Shaka. pp. 416-418.

Marereni, off which there is anchorage during the north-east monsoon, under the lee of one of the Zeboma reefs, is a stockaded post of the Imperial British East Africa Company, situated on the coast 8 miles to the northward of Ras Ngomeni. A few men in the Company's service live in the stockade.

Game is said to be plentiful in the immediate neighbourhood, which is yearly frequented for a few months by a number of people who collect marereni weed in the forest, hence the name.

The Telegraph line between Lamu and Malindi passes near Marereni.

Zeboma or Pamamba reefs.—Off Marereni are several detached reefs which break heavily and uncover at low water. The outermost lies $4\frac{3}{5}$ miles from the nearest coast, with the high summit of Ngomeni bearing S. 28° W.

Anchorage in 5 fathoms under the shelter of one of the outer reefs, and between it and the inner, will be found approaching from the southward, and keeping over towards the outer reef to avoid the considerable sea when the water shoals below 5 fathoms.

Shoals extend to the northward and eastward of the Zeboma reefs for 8 miles from the coast. To clear them Ngomeni high summit should be kept bearing to the westward of S. 40° W.

Kalifi river.—The mouth of the Kalifi should not be approached from the southward. A conspicuous sand hill, situated $1\frac{1}{4}$ miles to the northward of the mouth, kept on a W. by N. bearing, will enable a ship to close the shore with gradually decreasing depths, and with safety. Kalifi river is said to flow from Laka Karawa, and is described as a deep stream with a strong current.

See chart, No. 848.

pp. 416–418.

Tana river.—The mouth of the Tana is difficult to distinguish. The neighbourhood may be recognized by a range of bushy hills, 108 to 140 feet high, which lie about 2 miles to the west of it. The Tana may be approached from either the northward or southward.

A shoal with 4¼ fathoms least water on it lies off the coast abreast of the river mouth, and the discoloured river water during an ebb tide extends to this distance. The river has been traced to Mount Kenia, and is described as being a considerable stream up country, but during its course to the sea it disperses over the low land, and at the coast is insignificant. A narrow sandy bar crosses the entrance, which should not be attempted except in the finest weather, and at high water.

Probably during the north-east monsoon, and when the tide suits in the early morning, boats drawing 6 feet could enter. The course of the river is nearly parallel with the direction of the coast for about 6 miles from its mouth, the direction is then about north and south for about 4 miles from the coast, to Charra, where there is a Custom house. Here it is joined to the Ozi by the Belaso, a narrow canal about 2 miles in length.

Cultivation on the Tana commences about one mile south of the canal. The course of the river is very tortuous.

There are no inhabitants on the river near the coast, but parties of woodcutters from Lamu bivouac about the mouth during the fine season. The timber is said to be valuable.

During the rainy season, the surrounding country is inundated for many miles. Fish are abundant, and there are many alligators and hippopotami.

The Tana has been ascended by the *Kenia*, 2½ feet draught, a small steamer of the Africa Company as far as Baza, about 300 miles from its mouth, reaching that place on the 27th June 1891.

Coast sand hills.—From the mouth of the Tana the coast gradually inclines to the eastward. Sandhills rise to 170 feet at about the place where the river suddenly leaves the coast, and are there called Kitanga Tangani. The soundings increase off the coast in a regular manner, and the bottom is sandy; this continues to the mouth of the Ozi river. Boats can land in the early morning on most days during the north-east monsoon.

See chart, No. 848, and plan No. 1,747.

Ozi river.—Kipini is a miserable collection of huts near a fort on the eastern bank of the Ozi river at its mouth, and is the only place in Formosa bay where there appears to be any probability of future trade. There is a white stone pillar just eastward of the bluff. The fort and village are not conspicuous, but the flagstaff shows above the sky line. Kipini may be approached without danger during the north-east monsoon. Vessels will anchor according to their draught with the fort bearing N. $\frac{1}{4}$ W.* pp. 416-418.

The bar of the Ozi is passable during the north-east monsoon under ordinary conditions. The least water obtained was 2 feet at low water springs. The channel is narrow but straight, so that leading marks or lights could easily be placed. The river is deep enough for small dhows to ascend to the mouth of the Belaso canal, connecting with the Tana about 14 miles from Kipini.

Kau and Witu.—Ten miles up the river is the town of Kau, with a population of about 500, from whence is the shortest road to Witu. It is stated to be about 16 miles from Kipini by road.

It was at Kipini that the force from Admiral Freemantle's squadron, landed in October, 1890, and marched to Witu and destroyed it.

The country around Witu is very flat, cultivated in parts, especially with cotton plantations, it is bounded on the north by forests and swamps. The town is situated on a slight ridge in the midst of a flat, cultivated valley, but surrounded by dense forest. Population, about 3,000, consisting of Swahilis, mixed with some Gallas and Somalis. Witu is under the administration of the Imperial British East Africa Company, who maintain a small garrison here.

Communication.—Witu is connected with Lamu by telephone.

Ras Shaka, the north-eastern extreme of Formosa bay, is a low rocky point with a ridge behind covered with mkoma palms and jungle which conceal the ruins of the once thriving town of Komana. Ras Shaka is sometimes known as Ras Komana. It is surrounded by a fringing reef which covers and uncovers, and from it extends a considerable area of irregular ground which makes it an unsafe locality for shipping. This foul ground on which no rocks have been found, connects Ras Shaka to the Mwamba Zewoyu. The channel between should not be used by vessels of heavy draught.

* *See* chart, No. 848, and plan of Ozi anchorage, on No. 1,747.

pp. 416. 418.

Mwamba Zewoyu, or Ozi reefs, is a large shoal with many scattered rocks, some of which are always above water. It is a serious danger to vessels navigating the locality in thick weather or at night and should be given a wide berth. There are two lines of rocks running nearly parallel to one another connected towards their northern ends by a shoal. The outer line of rocks, which are situated on the extreme edge of the shoal, cover at high water spring tides and at that time are difficult to distinguish. The inner line are a succession of rocky islets, the highest being 14 feet above the level of high water springs. To the south-westward of the highest lie several heads which cover and uncover, the most distant being 1½ miles off.

The southern rock of the outer series lies the same distance from the highest rock and bears S. 7° W. from it. It forms the outer danger for vessels bound to Kipini, and should be sighted by them when bound from the northward before the course is altered to enter the bay. Both the southern rocks or their breakers, if the tide is high, should be sighted and given a berth of 1½ miles by any vessel drawing more than 12 feet as rocky spits run off in the line of the rocks on which there are indications of shoal water.

Anchorage with good shelter from the sea may be found on the western side of Mwamba Zewoyu about 1½ miles off the highest rock, in from 5 to 3 fathoms. It should be approached with the right extreme of the land 3 miles to the northward of Ras Shaka bearing N. 55° E. The hill, 174 feet, situated 2¾ miles W. ½ S. from Ras Tenewiati, will be shut in.

COAST.—Aspect.—Four and a half miles to the northward of Ras Shaka are some conspicuous sand hills, 185 feet high, with a white sand patch on the sea face.

From Ras Shaka the coast trends north-eastward for 17 miles to Ras Mbiongo the south-western extreme of Lamu bay. At 11 miles from Ras Shaka the sandy peninsula of Ras Tenewiati projects about one mile, and as quickly returns to the general trend. Behind all this coastline are sandhills varying from 50 to 185 feet in height. The conspicuous hill, 174 feet high, 2¾ miles W. ½ S. from Ras Tenewiati and the hills of Dongo Kondo are good marks. Tenewi and Kanyika are generally conspicuous, showing black against the land. This is particularly apparent in hazy weather.

See chart, No. 848.

To the northward are the hills on Lamu and Manda, all excellent landmarks. pp. 416-418.

From the rocks forming the outer line of Mwamba Zewoyu a succession of shoals stretch to the northward parallel with the coast, Mwamba Mazarui being the only one that dries. Vessels from the southward should not venture within 4 miles of the coast in this locality, nor into depths of less than 20 fathoms until near Tenewi.

TENEWI is a line of rocky islets, from 5 to 40 feet high, on a reef off Ras Tenewiati, and distant $1\frac{2}{5}$ miles from the end of that point. They are an excellent landmark as they show up against the coast hills and may be approached with safety by vessels bound up or down the coast.

Anchorage.—Good anchorage during the north-east monsoon will be found on the south-western side of the reef, entering from the southward; with the conspicuous hill (194 feet) bearing N. 50° W. which will lead 5 cables southward of Tenewi reef. When Kanyika is seen clear open to the westward of Tenewi haul up to N.E. and anchor under the lee.

Between Tenewi and Ras Tenewiati the space is almost blocked by reefs which extend off the latter and run parallel to the coast for $1\frac{1}{2}$ miles when they suddenly disappear. Vessels should not pass inside Tenewi.

Kanyika is a rocky islet 26 feet high, $2\frac{1}{3}$ miles off the coast at Ras Mbiongo, the south-east extreme of Dongo Kundo. Shoal water extends to the south-westward for $1\frac{3}{4}$ miles and it should not be passed on that side.

Lamu* is the most important town northward of Mombaza. It is situated on the east coast of Lamu island at about 3 miles above the bar, and has a sea front of about 1,400 yards. It stands on a slight eminence, with a fort in about the centre of the southern portion of it. The fort is old, about 100 yards square, with walls 40 feet high. pp. 420, 421.

The administration is now in the hands of the East Africa Company.

* *See* plan of Lamu harbour, No. 1,747. The above remarks cancel from line 13 p. 420, to line 3 from bottom of p. 421.

pp. 420-421.

Population.—Trade.—The population is about 5,000, including Arabs and Suahelis. There is trade in hides, ivory, sim sim, and mat bags; and the Customs revenue in 1891, was about Rs. 7,000 per month, but this may be expected to increase largely as the neighbouring mainland becomes more settled.

Supplies.—Bullocks, sheep, poultry and vegetables are abundant, also rice and dates at times.

Mails.—Telegraph.—Lamu is connected with Zanzibar, *vid* Mombasa, by telegraph, and with Witu by telephone. The British India Company's steamers call here monthly. The German East Africa Company's steamers call here. *See also* p. 6.

The water is only fit for the boilers and can be brought off in open boats from wells at Shella or Lamu. The company have a steam launch and an iron lighter, which are useful for transport purposes.

Lamu harbour.—Called by the natives Amu (an arm), formed between Lamu and Manda islands, is long, narrow, and, above Shella, encumbered with shoals, but it can be used with due caution by vessels of 20 feet draught, and with a proper system of marks and buoys by vessels of 23 feet draught.

A vessel of 20 feet, provided that she was not more than 300 feet long, could swing at moorings off Lamu, as the channel at low water springs is 300 yards across. The bottom is mud and sand Unfortunately there are no reliable natural leading marks, although it would be easy to place artificial ones if the increase of trade made it worth while for steamers of heavy draught to lie off the town of Lamu.

Bar.—Lamu bar is formed by the reef bordering Ras Kitao and Diamond spit, a shallow bank extending in a southerly direction from Shella point. The bottom on the bar appears to be composed of sand and weed with probably rock underneath on the eastern side. The sea breaks on both sides with a swell from the southward. The channel is straight but narrow and carries 18 feet at low water springs. A little westward of the leading marks there is not above 15 feet.

Directions.—An octagonal pillar 18 feet high and painted black, is situated on the southern extreme of Shella point. Above this on

See plan, No. 1,747.

the eastern high sand hill 170 feet high is a mast from which steamers are signalled. These two kept in line N.N.E., lead over the bar until the battery on the north point of Ras Kitao comes in line with Manda Peak bearing N. 80° E.; then steer in N. 42° E. for the southern extreme of the entrance to Mto Hazini. The ebb stream sets strongly towards Diamond spit and the above bearing must be carefully kept on ahead until the pillar bears West which is the most roomy position if a ship anchors in mid-channel. Here the depth is 4 fathoms. pp. 420-421.

If intending to proceed up the harbour, incline towards the Shella side after passing the above bearing of the pillar and when the fort at Lamu is seen opening from the square building on the point at Shella, steer N. 24° E. to clear the south point of Mto Hazini by about 2 cables, until Chapel rock, if visible (dries 8½ feet), is in line with the flagstaff on the Shella hills bearing S. 40° W., when alter course to N. 23° W. which should keep a vessel in mid-channel between the banks until Lamu fort bears S. 84° W. and the signal flagstaff at Shella S. 5° W.

The mangrove points must not be trusted for fixing position by, but the Shella flagstaff, Lamu Fort flagstaff, a tall conspicuous cocoa-nut tree on the north point of Lamu island, and the two conspicuous white houses of the East African Company, the southern of which is the office, are useful marks.

Tides.—It is high water at Lamu, full and change, at 4 h. 40 m., springs rise 11 feet, neaps 7 feet. At the bar it is high water 20 minutes earlier.

The tidal stream is much stronger at Shella (about 2½ knots) than at Lamu and with a northerly wind especially.

The nearest to the rocky point at Shella of a series of rocks which cover and uncover and also the largest of them, is a useful mark for ascertaining the amount to be added to the soundings shown on the chart, as they are reduced to 8½ feet below the top of it. When it is covered there must be at least 26½ feet of water on the bar.

Creeks.—Mlango Kipungani is the name given to the channel which separates Lamu island from the mainland. It is apparently deep enough for boats at low water springs. The southern and western portion and as far as 3 miles eastward of Matadoni was sounded by

See plan, No. 1,747.

pp. 420–421. officers of H.M.S. *Swallow* in 1894, and was found to have general depths of 2 to 3 fathoms at low water; but there is a bar right across with 6 feet water only at about one mile eastward of Matadoni. The flood streams are said to meet off Matadoni.

Mlango Nkunumbi has also been partly sounded. The depth is about one fathom at low water for about half way up to the village of the same name, whence it gradually reduces to one or 2 feet off the village.

p. 431. **PORT DURNFORD.***—The entrance was partially examined by H.M.S. *Racoon* in November 1892; *see* amended plan on sheet of plans, No. 671. Omit lines 1 and 2 from bottom of page, and to line 15 on p. 432, and insert:—

A spit with from one to 3 fathoms on it extends about 4 cables southward of Nott sandhead; its extreme lying with Foot point rock bearing E.N.E. about 4½ cables, the channel between it and Hood ledge being reduced to a width of less than 2 cables. A similar spit extends about 3 cables into the channel from Joyce sandhead reducing its width to about one cable.

Bar.—The entrance is between Foot and Hood ledges, the latter being a ledge of rocks with 3 coral heads above water, situated near the north extreme of Hood reef, which projects from the western shore. About half a mile within the ledges is the bar which possibly has a depth of 3½ fathoms at low water, but there is a patch of 2 fathoms directly in the fairway.

Anchorage.—There is temporary anchorage in about 10 fathoms at about 6 cables seaward of Foot point.

Directions.—In approaching port Durnford from the northward, the break in the coast line forming the estuary is most distinct; from the southward it is less recognisable, but Rozier hill is an unmistakable landmark. On a nearer approach Hood ledge with its 3 coral islets is easily distinguished; and soon after Foot point will be seen, and also the conspicuous clump of casuarinas on the west side of the river; the flagstaff at the village of Birikau is visible from the anchorage. The channel over the bar is tortuous and liable to change, so that no directions can be offered for it. No vessel should attempt to enter without first examining and buoying the passage.

* *See* plan on No. 671.

The village of Birikau on its west bank, has about 200 inhabitants. No supplies worth mentioning are obtainable, though a few sheep may possibly be obtained. The wells were about dry (November). p. 431.

The steam cutter of the *Swallow* ascended the river about 20 miles, at which distance there was but little water (it however, was the dry season).

Tovai island is said to be known also as Tulu or Tuala, but it must not be mistaken for Tulu situated 10 miles to the south-westward of it. There are two flagstaffs at the north end of Tovai, and a conspicuous sandy path up the slope southward of them. p. 433.

KISIMAYU BAY.—Omit lines 6 to 10 and insert. The Residence (*white*) is a conspicuous object from seaward. It and the old yellowish fort and the village to the eastward are enclosed by a stockade. p. 435.

Shoal.—A doubtful cast, giving a depth of $2\frac{1}{2}$ fathoms at low water, was reported by H.M.S. *Racoon* 1893, as lying with Smyth islet touching the north-west extreme of Green island, S.W. $\frac{1}{8}$ S., and Fawatu island beacon S.E.

The pillar, reported not visible in footnote page 437, does not exist. Amend line 5 on that page; and line 6 from top and 4 from bottom of page 438. A light coloured pillar 20 feet high stands on the south-west side of Mark hill, which kept in line with the cairn on Pillar rock bearing N.W. $\frac{3}{4}$ W., is a good mark for Knott pass, but it is probably not easily recognized when approaching the pass from seaward. pp. 437, 438.

Supplies were scarce in 1893.

Juba or Jub river* forms the boundary between the British and Italian spheres of influence. p. 440.

This river was ascended by Commander F. G. Dundas, R.N., of the Imperial British East Africa Co.'s service in the *Kenia*, in July—September 1892, as far as the rapids, about 20 miles above Bardera, and about 407 miles above its mouth.

The *Kenia* is 86 feet in length, 23 feet in breadth with a draught of $2\frac{1}{2}$ feet.

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* *See* plan of Juba river on sheet of plans, No. 671.

p. 440. Leaving Gobwen, the village 2½ miles within the entrance, on 23rd July, the vessel without any very great difficulty reached the rapids about 14th August, and left again on 16th, finally reaching Gobwen again on 20th September. On account of the river having fallen considerably great difficulty was experienced on the return journey, the vessel being many times aground.

The bar, on entering, was much the same as described in the volume. A report of 1893 states there was a depth of 7 feet at low water, but there was a very sharp turn. About a fortnight was occupied in obtaining permission to proceed peacefully through the lower part of the river, possibly about 100 miles. Above Gobwen depths of 2½ to 3½ fathoms were carried for about 8 miles or nearly to the large villages of Hajowen and Hajualla; these are the only large villages between the mouth and Munsur, 360 miles up, and they each have a population of about 900. (The two large villages were destroyed in 1893). The country still consisted of large grass plains with occasional wood, and game was exceedingly plentiful, but the river is very tortuous, doubling back on itself in places, and snags are plentiful. Near Mataku (on the equator) the river was only from 15 to 20 yards wide in places, with dense overhanging foliage. The river forked below this place, re-uniting some miles above it, and expanding to a width of about 120 yards.

At Fuleile lat. about 0′ 10″ N., the chief of the Gusha district resides; the Swahili language is spoken here. From the village to Bilo, 100 miles above the entrance, there are numerous densely populated villages, the banks are cultivated, and large groves of bananas, &c. are constantly met with. A few miles above Bilo is a branch to the south-west, which was explored for about 20 miles; it had depths of about 3 fathoms, a 3 knot current, and the trees overhang in many places, so that the vessel was turned only with considerable difficulty. Returning to the main branch, there was dense impenetrable forest on either side, which continued for about 5 days, without any sign of human life, when the village of Kabote was reached (lat. 1° 35′ N.), on August 2nd. (The river rose 18 inches in one night.)

Above **Anole** (lat. 2° 0′ N.), the banks entirely change, becoming hard and stony, and a plateau 200 feet in height extended on either side. Three rocky bluffs 150 feet high, rise abruptly from the river just before arriving at the large Somali village of Mansur.

See plan on sheet of plans, No. 671 and chart, No. 597.